FACULTY RESEARCH PRODUCTIVITY AT ADDIS ABABA UNIVERSITY

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Dissertation Prepared for the Degree of

DOCTOR OF PHILOSOPHY

UNIVERSITY OF NORTH TEXAS

May 2011

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Stafford, Mehary T. Faculty research productivity at Addis Ababa University. Doctor of Philosophy (Higher Education), May 2011, 86 pp., 33 tables, 1 figure, references, 66 titles.

This study explores the research productivity of Addis Ababa University (AAU) faculty. AAU was established in 1950 and is the oldest modern higher educational institution in Ethiopia. Recently AAU took steps to transform itself to become a pre-eminent African research university. One of the characteristics of a research university is the focus on the amount of research conducted by the institution's faculty. Academic institutions measure research productivity primarily based on published work. The purpose of this study was to analyze the research productivity of AAU faculty, and to examine the differential predictive effects of individual and environmental variables on faculty research productivity. This quantitative study used a theoretical framework and instrument, Faculty at Work. Four hundred questionnaires were distributed to Addis AAU faculty in person and 298 questionnaires were returned resulting in a 74.5% response rate. After exclusion of 12 cases with missing information, 286 cases (71.5% response rate) were analyzed. Most of the respondents were men (M = 92.1%, F = 7.9%). The average age of AAU faculty was 44. A hierarchical multiple regression was used to examine the ability of six sets of independent variables (sociodemographic, career, self knowledge, social knowledge, behavior, and environmental response) to predict research productivity (publication output). Results indicated that there are productive researchers at AAU, and the theoretical framework explained 67.6% of the variance in publication output.

ACKNOWLEDGEMENTS

I wrote the dissertation with the guidance and support of so many people around me. I would like to say thank you to Dr. Marc Cutright, Dr. Michael S. Lawson, and Dr. Ron Newsom for their contribution to this research and their mentorship. I would like to express my heartfelt thanks to Addis Ababa University faculty who participated in this study. I would like to say thank you to Dr. Shimelis Admassie, Professors Andreas Eshete, Brook Lemma, Fekade Azeze, and Endashaw Bekele. I am also thankful to Dr. Janet H. Lawrence for allowing me to use the Faculty at Work instrument.

I am honored to have a supporting family in Ethiopia and the United States of America. Your support sustained me through the years and I am forever grateful to all of you. My special thanks goes to my wife Paige and our two children Kaitlyn and Ashlyn. The journey was long but it was all worth the time and effort invested in it. Finally, I would like to give all the glory and honor to the Triune God who gave me life through faith in the salvific work of Jesus Christ alone.

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CHAPTER 1

INTRODUCTION

This study explores the research productivity of Addis Ababa University (AAU) faculty for the last five years (September, 2004-August, 2009). Addis Ababa University is the oldest modern higher educational institution in Ethiopia and English is the medium of instruction. The university went through tremendous changes since its establishment as the University College of Addis Ababa, in 1950 (Teferra, 2003; Wondimu, 2003). Between 1950 and 1955, there were six degree granting autonomous colleges (University College of Addis Ababa, College of Engineering, Building College, Imperial Ethiopian College of Agriculture and Mechanical Arts, Theological College, and College of Public health) and they were integrated in 1961/2 to form Hailesilassie I University (Amare, 1982; Wagaw, 1994; Bekele, 1995).

In 1974, Emperor Hailesilassie was overthrown and the university was named Addis Ababa University in 1975. In 1979, AAU began offering master's level graduate degree programs and in 1987 the university opened doctoral degree programs. AAU offers Diploma, Bachelors, Doctor of Medicine (MD), Doctor of Veterinary Medicine (DVM), Masters, Specialty Certificate and Doctor of Philosophy (PhD) degree programs. For the last sixty years, the University has served as one of the major higher learning institution in Ethiopia. Until early 2000, there were only two universities and seventeen colleges in Ethiopia (Wondimu, 2003). AAU has ten campuses. Seven of the campuses are located in Addis Ababa and the rest are located around or close to Addis Ababa. AAU has three colleges, seven faculties, ten schools, and five research institutions.

From its inception as a university in 1962, AAU tried to engage its faculty in research. The university charter, then it was known as Haile Selassie I University charter, "clearly stated

research as one of the major components of the duties of a university" (Bekele, 1995, p. 1). Recently Addis Ababa University developed a strategic plan to map the future direction of the institution. The university is taking steps to shift its focus towards graduate school and research. The strategic plan is the first attempt to chart its future direction. With an enrollment of 7000 graduate students, AAU has increased graduate admissions by 400 % (AAU, 2008a), and it is transforming itself to become a predominantly graduate and research institution. According to the strategic plan (AAU, 2008), the vision of the Addis Ababa University is, "...to be a pre-eminent African research university dedicated to excellence in teaching, critical inquiry, creativity and public action in an academic community that cultivates and celebrates diversity" (p.1).

Among the characteristics of a research university is its focus on graduate level education and the amount of research conducted by the institution's faculty. A university faculty is expected to stay abreast and master the content of their field, practice the skills required by the field, and research skills that are appropriate to their field of expertise (Arreola, 1995). If the primary focus of Addis Ababa University is moving towards graduate education and research, it is helpful to have empirical data on its faculty research productivity.

Statement of Research Problem

The problem of the proposed study is faculty research productivity at Addis Ababa University. As the university is transforming itself to become an institution that focuses on graduate education and research, are the faculty members productive in their research performance? What is the current level of research productivity? A common measure of research productivity is publication. In this regard, what factors predict faculty research productivity? This study examines research productivity among the university faculty by using individual-

psychological (sociodemographic, career, self-knowledge, social knowledge, and behavior) and environmental variables (environmental response).

Purpose of the Study

Following recommendations from the literature this study is designed to explore research productivity of AAU faculty. The study attempts to examine individual and environmental factors predicting faculty research productivity.

Research Questions

This study attempts to answer two research questions:

(1) How productive are the faculty of AAU in research?

(2) What are the differential predictive effects of individual and environmental variables on faculty research productivity?

Significance of the Study

Any university is productive by the performance of its faculty. In higher education, one type of productivity is research productivity. Thus, the increase in research productivity should be directly related to an increase in organizational effectiveness (ean, 1982; c ee ord, 1987; eara & Braskamp, 2005). Knowledge of the research performance of the faculty will enable faculty members and administrators to know where they stand in research collectively. The information can be translated into practical use to address faculty research productivity. Since AAU is in the midst of a significant transformation, this research will contribute to its growth by examining the status of research productivity of its faculty. This research also identifies, within the faculty at work theoretical framework, effective individual and environmental predictors of faculty research productivity. Findings from this research will serve

as a stepping stone for further research to measure institutional effectiveness in research activities and to improve faculty research practice.

Definition of Terms

Research productivity is a tangible evidence of research achieved by the faculty which leads to a concrete product like a journal article, report, monograph, book chapter, book, a grant proposal, and the like (Blackburn & Lawrence, 1995; Bean, 1982).

Sociodemographic construct includes age, sex, and race/ethnic/citizenship identities.

Career construct includes academic discipline or area of specialization, graduate school attended, highest degree earned, academic rank, tenure status, career age, and publication record.

Career age is the number of years as a faculty member at any institution.

Self-knowledge is one's (faculty) understanding of self, or self referent thought. It includes self-perceived beliefs, attitudes, and values, such as one's efficacy as a researcher and one's level of ambition and persistence (Blackburn & Lawrence, 1995, p. 16).

Social knowledge is "faculty perception of their environment" (Blackburn & Lawrence, 1995, p. 17). It refers to how faculty perceive the environment, for instance, how supportive one's colleagues are of research, and what work activities are valued by the university administration.

Behavior is the specific activities a faculty member engages in as well as the levels of effort expended (p. 28). It refers to the percentage of effort allocated to research, (p. 306).

An *environmental condition is* a construct that represents the structural and normative features of the university or college (p. 17).

Environmental response is a construct that includes the different types of formal feedback that faculty receive about their role performance (p. 18).

Social contingencies are events that happen within the personal environment of the faculty member's life (the birth of a child, illness, etc.) that will affect their research performance.

Faculty refers to a person with an academic appointment of teaching, research or both within a higher education institution.

Theoretical Foundation

This study used lackburn and Lawrence's faculty at work (1995) theoretical framework. It "was designed to gather data on faculty perceptions of their work environment and their own competency and efficacy as faculty members, their assumptions about teaching, and their research, teaching, and service behaviors" (Blackburn, Bieber, Lawrence, & Trautvetter, 1991, p.389). Blackburn and his colleagues used the first Faculty at Work survey in 1988-1989. The theoretical framework integrates the research on faculty role performance and productivity with motivation theories (Blackburn & Lawrence, 1995).

As a result of the critical reviews by Fox (1983, 1985) and Creswell (1985) about the lack of a theory regarding faculty productivity, Blackburn and Lawrence developed the theoretical framework that had incorporated sociological, psychological, and environmental measures. The theoretical constructs representing individual and environmental properties were derived from the higher education literature. In their study, Blackburn and Lawrence examined individual and environmental properties that contribute to or influence faculty behavior and productivity. The framework emphasized that present and future productivity will be affected by the ongoing interaction between individual faculty and their environment.

To test the framework, they administered the Faculty at Work survey to faculty members in eight disciplines (history, English, biology, chemistry, mathematics, political science,

psychology, and sociology) located across the nine Carnegie classification institution types. The survey was administered between November 1988 to January 1989, and it was completed by 4400 faculty members (54% response rate) (Blackburn, et al., 1991). Figure 1.1 shows the relationship between the variables in the theoretical framework used by Blackburn and Lawrence.

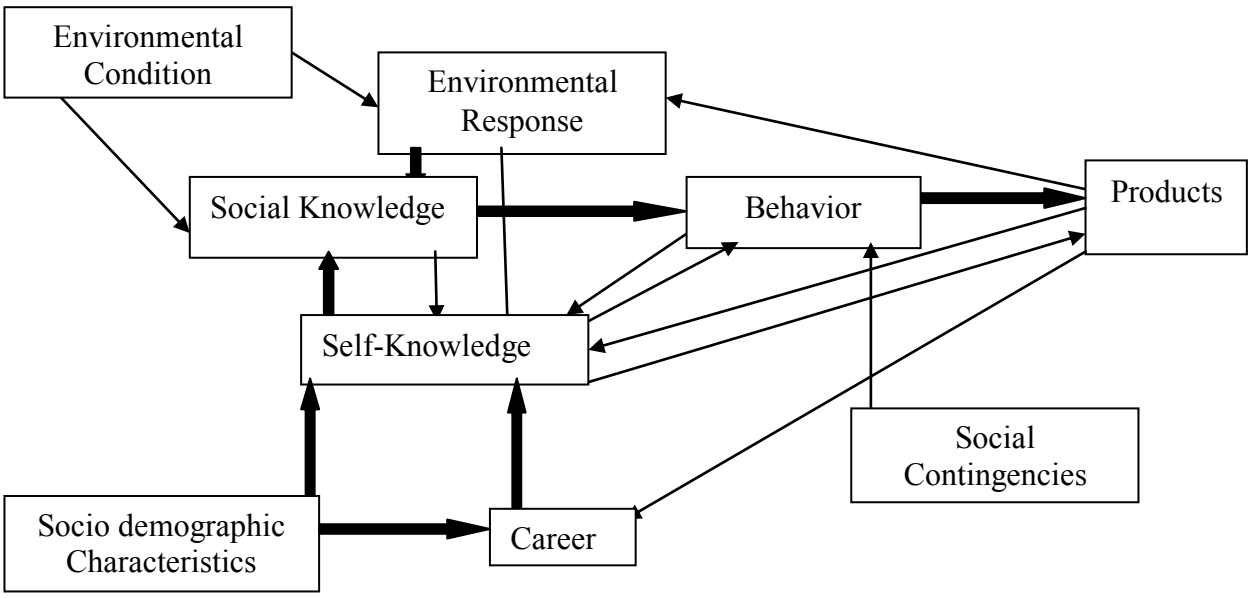

Figure 1. Theoretical framework. The thick, heavier arrows signify strong, direct effects of the variables in one category on the variables in the category the arrow points to. The thin arrows acknowledge that there are weaker effects between several of the principal constructs. Adapted from *Faculty at Work,* by R. Blackburn and J.L. Lawrence, 1995, p. 27.

Limitations of the Study

This research has four limitations that can impact the accuracy and validity of the study. First, the focus of this study is only on research productivity of AAU faculty. There are other forms of faculty productivity (teaching, scholarship, and service). However, this study examines only the research productivity of AAU faculty. Second, this is a self reported measure of productivity. The number of their publication and other research activities reported are

dependent on how much faculty members can recall the number of their published work and other research activities. Third, they are reporting the quantity of their published work not the quality of what they have published. The number of published work by faculty does not tell us about the quality of the published work (Layzell, 1999). Response rate of the survey is another limitation of this study. Previous studies show that there is low response rate of surveys from African scholars. Teferra (2003a) received more response (44 out of 94) from Ethiopian scientists (Addis Ababa University and Mekele University) because he is originally from Ethiopia. This study distributed the survey to faculty members individually and not through department heads. Faculty members were visited more than two or more times to remind them to complete the survey.

Delimitation of the Study

This study has the following delimitations. The study focuses only on Addis Ababa University (AAU) faculty members who are willing to participate in this study. The information from this study can be helpful to other institutions; however, the study findings can be generalized only to AAU faculty members.

CHAPTER 2

REVIEW OF LITERATURE

The review of the literature presents an overview of faculty research productivity studies, models and predictors.

Measures of Faculty Research Productivity

Faculty members conduct research and their productivity is measured in various ways. Academic institutions primarily measure research productivity based on published work, externally funded grants, and the number of citations the published work received (Layzell, 1999; Middaugh, 2001; Porter & Umbach, 2001).The most common productivity measures look at publications that are submitted, accepted (in press), or published. The published works could be journal articles (refereed and non-refereed), books (including edited books, textbooks), book chapters, monographs, conference papers, and research proposals written to receive external and internal grants (Middaugh, 2001). The list of productivity measures was used by the Delaware study that "focused on instructional cost and faculty productivity at the academic discipline level of analysis (Middaugh, p. xix). Blackburn and Lawrence (1995) and Blackburn and Bentley (1993) used three outcome variables as measures of research productivity: published work, presentations on a national and international level, and conversations regarding research.

Researchers present their ongoing research or converse with colleagues to let others know about what they have discovered. Grant money is sought to assist them to focus on their research and disseminate their findings through publications. The number of citations received is dependent on the published work. Therefore, this study looks at publication output as a dependent variable to measure faculty research productivity. However, faculty members' research and scholarship activity, presentations, and additional information are collected to

explain publication productivity. This study did not include number of citations received as a measure of faculty research productivity.

Through publication, scholars keep abreast of their field, verify information, obtain critical response to their work and redirect research interest (Fox, 1985; Arreola, 1995; O Meara & Braskamp, 2005; AAU, 2008). Publication enables the university faculty to communicate their expertise and scholarship within and outside the academe (Teferra, 2003a; AAU, 2008). Publication is, in turn, the primary basis of scholarly recognition and esteem within institutional, national, and international level (Cole & Cole, 1973). Kennedy (2005), in his discussion of academic duty wrote, "All the thinking, all the textual analysis, all the experiments and the data gathering are not anything until we write them up. In the world of scholarship, we are what we write. Publication is the fundamental currency" (p. 186). The literature suggests that research is not done until it is published and publication is becoming one of the most important requirements of faculty reward system like tenure, promotion, and other recognitions (Blackburn & Lawrence, 1995; Tien, 2000; Bieber & Blackburn, 1993; Chan & Burton, 1995).

The Variation in Research Productivity

The research performance of faculty in higher education is highly variable and research productivity researchers attempt to explain the variation in faculty research productivity (Allison & Stewart, 1974 cited by Blackburn & Lawrence, 1995; Creswell, 1985; Creamer, 1998). An examination of the literature reveals that two general types of variables are assumed to explain the variance in individual research productivity: individual variables and environmental variables (Bean, 1982; Fox, 1985; McGee & Ford, 1987; Blackburn & Lawrence, 1995; Dundar & Lewis, 1998). The individual factors are characteristics of faculty members and it includes sociodemographic data (sex, age, race/ethnic identities), career variables (career age, discipline,

prestige of the institution faculty member attended graduate school), and motivation (Fox, 1983; Blackburn & Lawrence, 1995). The environmental characteristics are the institutional resources, norms or physical plant that will limit or enhance faculty productivity (Blackburn & Lawrence, 1995). Some researchers used different terms or added variables that could fall into either individual or environmental variables (Dundar & Lewis, 1998; Fox, 1985; Creswell, 1985; Porter & Umbach, 2001).

In his exhaustive review, Creswell (1985) summarized the literature of faculty research productivity until 1985 and he offered four explanations of the variation in faculty research productivity: psychological-individual, cumulative advantage, reinforcement, and discipline. Creswell (1985) noted that the relationship between individual and environmental variables and research performance remains unsolved. He suggested that "researchers might consider using academic rank, discipline, institutional affiliation, even perhaps career age ...as control variables in a predictive model and examine closely the significant correlates of productivity that are related to the work environment of the scholar" (p. 71). Porter and Umbach (2001) used human capital, personal tastes, career status, teaching workload, and demographics as indicators of productivity. In her review of the literature, Fox (1985) explained faculty research productivity through individual characteristics, environmental factors, and feedback.

According to Bland and Schmitz, (1986, cited by Hekelman, Zyzanski, & Flocke, 1995), there are 13 characteristics of effective researchers:

> Characteristics of productive researchers include personal motivation, adequate research time, mentors/advisors, in-depth content knowledge, research skills, early scholarly habits, local peer support, a network of productive colleagues, internal and external

> orientation, autonomy and commitment to the organization, multiple projects, socialization to academic environments, and sufficient resources. (p. 239)

Cattell (1963 cited by Creswell, 1985) recommended the importance of both individual and environmental variables when he stated:

> Effective research is a product, first, of a socio-cultural climate; second, of a sufficiency of individuals gifted with an uncommon combination of abilities and character qualities; third, of a satisfactory economic-administrative matrix; fourth, of special acquired research skills and thorough process; and last, of daily working conditions which, at the least, must not hamper creative minds. (p. 199)

The individual and environmental characteristics do not operate by themselves. They are interwoven with each other. Individual research training and motivation, without a conducive environment, may not result in much productivity. A supportive academic environment will not be successful without the required training and research expertise of the faculty member. Faculty productivity is affected by the ongoing interaction between individual faculty and their environment.

Blackburn and Lawrence (1995) not only identified individual and environmental factors as indicators of faculty role performance but they added the dynamic interaction between self-knowledge (self judged competence) and social-knowledge (perceived institutional expectation given to a role) to explain faculty behavior. Their framework has listed four individual constructs (sociodemographic characteristics, career, self-knowledge and social knowledge) and three environmental constructs (environmental conditions, environmental response, and social contingencies) as indicators of faculty behavior. They examined personal motivations to engage in research and faculty members' perception of the environment as supportive of their research

endeavor. The research findings suggest that institutions can increase faculty research productivity by providing supportive environment, financial, and technical assistance. The review now examines the sets of individual and environmental variables that explain the variance in faculty research productivity.

Individual Characteristics

Research productivity is often associated with sociodemographic, psychological and sociological factors. At the individual level most researchers used sociodemographic variables as predictors. Creswell (1985) summarized and stated that there are four variants at the individual level: innate, "sacred spark" (p. 241), personality traits of researchers and personal characteristics. The first variant of the individual explanation is that productive researchers may possess "innate" scientific ability or talent that enables them to be more productive than others. The "sacred spark" explanation states that faculty members engage themselves in research because they have "a strong inner compulsion or motivation." A third variant includes explanation based on the personality traits of researchers. The fourth variant explains research performance by background or personal characteristics like sex and age.

Sociodemographic variables are considered to affect faculty research productivity (Blackburn & Lawrence, 1995; Creamer, 1998; Blackburn & Mackie, 1992). The sociodemographic variables include age, sex, and race/ethnic identity. The career construct includes academic discipline or area of specialization, graduate school attended, highest degree earned, academic rank, tenure status, career age (number of years as a faculty member), and publication record. Self-knowledge refers to understanding of self or self-referent thought. It is a measure of self-image and self-assessed competence, and sense of efficacy (Blackburn &

Lawrence, p. 16). Social knowledge is faculty perception about their work environment and characterize institutional and departmental climate.

Sociodemographic Variables

Age is studied widely as one of the predicting factors of research productivity. Age served as an indicator of academic research experience and maturity (Perry, Clifton, Menec, Struthers, & Menges, 2000). Those who publish more at an early age continue to publish (Blackburn & Lawrence, 1995). However, productivity decreases with the advancement of age. The quality and impact of later work rarely match what was accomplished at an earlier age (Zuckerman, 1967, cited by Blackburn & Lawrence, 1995). Growing old impairs performance, though performance improves with experience (age) (Creswell, 1985). On the other hand, Blackburn, Behymer and Hall (1978) argued that highest producers will remain to perform over time. Faculty members who publish less with age do not necessarily indicate less productivity. Older faculty who publish fewer articles seem to write more books, and there is a shift in the nature of productivity (Blackburn, 1972 cited by Blackburn et al., 1978). Chronological age has been a positive and negative predictor in faculty productivity (Bentler & Blackburn, 1990). The association of age and productivity is neither linear nor monotonic (Fox, 1985).

Sex correlates with faculty research productivity behaviors. As a group, academic women publish less than men (Fox, 1985; Creamer, 1998; Sax, Hagedorn, Arredondo, & Dicrisi III, 2002). There is a large gap between the proportion of women and men faculty who have published a large number of articles in academic or professional journals (Creamer, 1998). Studies in research productivity generally reveal that women publish less than men but the literature is not as clear about the reasons for the differential output (Creswell, 1985).

Researchers tried to explain the difference by looking at family related variables like marriage, number of children, having a spouse who is an academician, care of elderly parents, and potential conflict between family and career responsibilities. As a result some women faculty postpone marriage until they publish enough to earn tenure and the academic rank they desire (Bassara, 1979; Finkel & Olswang, 1994 cited by Sax et al., pp. 424-425). However, Astin (1978, cited by Fox, 1985) noted that married women publish more than single women. Another explanation offered by Sax et al. (2002) says that women devote more time to teaching and advising, teach in fields different from their training and spend significantly more time in childcare responsibilities. In higher education, most faculty are male and the number of publications of women faculty is far less than male faculty members. It should be noted that the academe is influenced by males. Comparing men and women faculty research productivity is inappropriate unless some variables are controlled (Creamer, 1998).

In a country where different ethnic groups exist, the variation in research productivity is studied by race (Blackburn & Lawrence, 1995). In this study, instead of racial or ethnic identity of faculty members, citizenship is used as a socio-economic correlate of faculty research productivity. Because of the inter-ethnic marriages some faculty members may have more than three or four ethnic identities. The issue is also not addressed in the United States where interracial children have to identify themselves as being black, white, Latino or other. At AAU there are Ethiopians, those who were Ethiopian by birth and but later changed their citizenship to their country of host during their stay in a foreign land, and non-Ethiopians. This variable enables us to explain the individual variance in research productivity by their citizenship status.

Career Variables

The career construct includes academic discipline or area of specialization, graduate school attended, highest degree earned, academic rank, tenure status, career age, and publication record. Academic disciplines shape research productivity and disciplines differ in their research activities. Faculty research productivity is different among different disciplines. Some measure productivity through publication and grant money received while others look at other forms of productivity like number of exhibitions held, number of performances, and number of software developed. Some disciplines value journal articles while others emphasize books and monographs. The impact of disciplines needs to be examined as an indicator of the variance in research performance of AAU faculty members.

The emphasis of graduate school where the faculty member earned the highest degree influences the research productivity. Such universities are highly selective in their choice of students. They introduce talented students to the academic profession. Research universities with resources introduce graduate students to the norms of the academic profession. Faculty members who are trained in research oriented universities will have the opportunity to engage in research. After graduation, they will have the skills and the scholarly network that assist them to conduct research and disseminate their findings. The length of time between attendances of graduate school and its influence on research performance of faculty members is debated. This study examines where faculty members earned their highest degree. The doctor of philosophy or its equivalent is considered a terminal degree in higher education. The level of education of faculty members is also used as one of the predicting career variables of faculty research productivity.

Academic rank in higher education covers from an instructor to full professor excluding other ranks given to institutional commitment or for retried faculty members. Academic rank is

awarded based on the standard set by the institution. Faculty members engage in research and publish their findings to get promotion from one rank to another. Porter and Umbach (2001) measured career status by academic rank. Faculty members with higher rank do publish and they are more productive than those with lower academic rank (Creswell, 1985; Porter & Umbach, 2001; Dundar & Lewis, 1998; Tien & Blackburn, 1996). Research and publication have become essential components of the promotion and tenure process (Blackburn et al., 1978; Braxton, 1983; Creswell, 1985, 1990). Generally award of promotion and tenure are based on grants and peer-reviewed publications.

Promotion is one of the predicting variables of faculty research productivity (Tien, 2000). The role of promotion in motivating faculty members to conduct a research and publish their findings is the major question in understanding faculty research productivity. Fox (1985) argued that institutions can maximize faculty productivity by using the reward structure for promotion. Others suggested that faculty do not publish to earn rewards. If institutional rewards like tenure and promotion are the motivation behind faculty productivity, publication performance would have declined after earning the desired status. However, faculty productivity is motivated by "sacred spark" and the inner drive because they love what they do as scholars (Cole Cole, 1973).

On the other hand, research shows a sharp decline in productivity after tenure (Walsh & Walkenbach, 1982 cited by Tien, 2000, p. 724). Promotion is not the only reward that motivates faculty to publish more. Peer recognition, income increase, satisfaction of curiosity, and the joy of involvement influence faculty research productivity. Publication record of faculty members is also a predictor of later productivity. Early productivity measures look at the age at first

publication and the number of publications after they earned the highest degree. Researchers who publish early will continue to be productive researchers.

Self Knowledge and Social Knowledge Variables

In developing the instrument Faculty at Work, Blackburn and Lawrence built a theoretical framework and they used non-cognitive (personal and career development, reinforcement, and dispositional) and cognitive (expectancy, attribution, efficacy, and information processing) theories of motivation to study possible relationships among correlates. The various parts of the framework were linked together with a cognitive motivation theory where the manner in which people differentially assess their personal abilities and interests interacts with their perceptions of the organization's priorities (what it supports) and causes them to engage extensively in some activities and less frequently in other activities (Blackburn & Lawrence, 1993). Self knowledge is self evaluation of competence, efficacy, commitment, interest, and role preference of faculty.

Social knowledge looks at faculty perceptions of the environment (institutional and collegial support, colleague commitment to the roles, beliefs about what the institution prefers). In their discussion of what constitutes social knowledge, Blackburn and Lawrence (1995) said, "Faculty form beliefs from experiences with colleagues, administrators, committee decisions, faculty meetings, instructional rules and norms, and professional association practices" (p. 99). Self knowledge and social knowledge are included in the theoretical framework by Blackburn and Lawrence and social knowledge is the key construct. It stands between faculty perception of themselves and their perception of the environment in which they work. It is the motivating factor for faculty behavior.

Environmental Characteristics

In addition to the individual variables under discussion, the environment contributes or inhibits their productivity. Two of the explanations given by Creswell (1985) are cumulative advantage and reinforcement. The cumulative advantage explanation looks at performance of successful researchers whose work meets or exceeds the standard set by the institution. It is based on erton's (1973, cited by Creswell, 1985) " atthew effect," which refers to the words of Jesus in the ospel of atthew (25:29), " or the one who has will be given more, and he will have more than enough." The atthew effect is used to refer to the recognition scientists receive from fellow scientists and they will have additional advantages as they progress through their careers. The advantage begins with a doctoral training in a prestigious university or department (e.g., Cole & Cole, 1973, pp. 74-75; Creamer & McGuire, 1998).

The reinforcement explanation looks similar to the cumulative advantage. However, there is a fundamental difference between the two. Cumulative advantage refers to resources that come with prestigious doctoral departments. Reinforcement is the feedback that faculty members receive from successful publication of their discovery, cited work, and formal and informal praise from other faculty members. According to the reinforcement explanation, when faculty publish the recognition they receive contributes to their motivation to publish more. Faculty members get recognition through institutional promotion or other forms of delayed reinforcement. However, the recognition received from colleagues and citations of early work stimulates them for more publication.

The environmental characteristics are the institutional resources, norms or physical plant that will limit or enhance faculty productivity (Blackburn & Lawrence, 1995). It also includes prestige of employing institution, the mission of the university, its research emphasis, reward

system, organizational culture, a positive group climate, colleagues, disciplinary differences, accessible resources, and leadership with research expertise (Hekelman et al., 1995; Chan & Burton, 1995). Several studies suggest that environmental characteristics are powerful predictors of research productivity (Hekelman et al., 1995). Individual perception of the work environment will influence their performance. Institutional and departmental climate set the standard for individual and group research productivity. Policies and the requirements for tenure and promotion motivate scholars to engage in research and publish their findings.

The graduate school one has attended will impact faculty research productivity. However, productivity of faculty members with sufficient research preparation can be affected by the environment. If the number of hours allotted for teaching exceeds the amount of time for research and scholarship, publication productivity will be affected. Environmental characteristics impact a faculty member's productivity (lackburn et al., 1978). Institutional preference and personal preference will enhance or inhibit research productivity. Some researchers considered teaching load as an explanatory variable of the amount of research conducted by faculty (Dundar & Lewis, 1998). However, some are cautious about the effect of teaching load on research productivity because the teaching load is self reported and faculty members may overestimate their teaching load (Porter & Umbach, 2001). In order to analyze teaching load, researchers look at the number of courses taught each semester, whether the courses are graduate and undergraduate courses, and class size.

According to Blackburn and Lawrence (1995), the environmental variables include environmental conditions, environmental response and social contingencies. Environmental conditions are represented with three sets of features: structural and normative features of the university or college (fiscal well being, location, composition of faculty, faculty governance,

etc.), student body and instructional resources (library, laboratory, etc.), and normative features (mission of the university). These environmental features have effects on faculty role performance (p, 17). The environmental response construct looks at formal feedback that faculty receive about their research performance. Another construct is social contingencies, which looks at events that happen within the personal environment of the faculty member's life (the birth of a child, illness, etc.) that will affect their research performance.

Research productivity in an African context

This study analyzes research productivity of AAU faculty within the context of its location and resources. AAU is facing a challenge of developing a research culture in the context of a high global demand of researchers who will address the local, national, and global needs. As an African institution established in 1950, it went through tremendous changes and many challenges.

Some of the challenges facing African universities are lack of faculty quality, well-prepared students and sufficient resources (World Bank, 2000). In developing countries, there is a need for well qualified faculty. Many faculty members in developing countries have little graduate level training, use old teaching methods and earn very low salary (Habib & Morrow, 2006; Sanyal & Varghese, 2006). An Ethiopian professor is paid $350 per month (Wondimu, 2003). This will challenge their effort to perform at high standard to compete with faculty in developed countries. There is also a lack of resources. These countries spend less money per student and they are dependent for their finance on the central government and funds from abroad. Developing countries devote less than 0.2 % of their GDP to research and development (UNESCO, 2005). The insufficient resources force university officials and faculty members to be unable to keep abreast with their field and to engage in research.

Research is an integral part of development, however, Africa is "peripheral to the world scientific system" (Altbach, 2003, p. 145). ost of the research is done outside Africa and African scholars are required to conform to the norms and paradigms created by the research producing community. n top of that, "major journals are often uninterested in publishing articles on African topics" (Altbach, p. 145). The international research oriented community of scholars is not interested in research that is relevant to Africa. However, there is a need for research that will address local, national, and regional issues. African scientists are stretched between keeping up with the current developments of their research and expertise and addressing local, national, and regional research needs. If African universities are to grow and address those needs they need to prioritize research.

Previous studies by Teferra (2003a, 2003b) addressed issues regarding scientific communication in Africa. More than 150 opportunity samples, sent by email, and about 30 printed copies of the questionnaire were distributed. A total of 94 responses were returned (44 from universities in Ethiopia) and analyzed. That accounts for 46.8 % of the total population studied. Cutright indicated that Teferra explored, "how do scientists in Africa communicate; how do they overcome the challenges to communication; and how can governments, institutions, foundations, and individuals improve scientific communication within the continent and with the rest of the scientific world" (Cutright, 2004, p. 1). He looked at African universities and the progress these universities made through their less than a century of existence and discussed the various issues challenging research productivity and communication. Some of the major challenges include, the economic decline, limited resources, limited government involvement to the advancement of scientific activities, and brain drain. Academic journals are one of the mediums of publishing. However producing reputable journals remains to be a challenge.

The era of the internet was thought to deliver access to relevant information to developing country faculty. The new technologies are important tools to minimize the difficulties of publishing or of consulting scientific research in developing countries. However, limited internet connections and the high cost of scientific journals and books inhibit the opportunity to have access to electronic and printed scholarly work done in developed countries. The digital divide is widening. Therefore, faculty exposure and knowledge of the discipline and recent developments is limited. Africa is not one of the major contributors of scientific production. According to the scientific index the percentage of publication by Europe (38.6) and North America (37.6) accounts for 76.2 %. Japan follows with 10.7 %. Africa's share is only 1 % and most of that comes from South Africa (UNESCO, 2005). Habib and Morrow (2006) discussed that even the research productivity of South African university faculty has been in the decline. The 21st century has brought its opportunities and challenges to African universities and higher education institutions are trying to restructure their priorities to compete in a global competition. One of the difficulties of universities in developing countries is that they are more focused in teaching than research.

Research Productivity at Addis Ababa University

From its inception as a university in 1962, AAU tried to engage its faculty in research. The university charter, "clearly stated research as one of the major components of the duties of a university" (Bekele, 1995, p. 1). Research institutes were established to engage researchers (faculty) with less teaching commitment. However, the research mission was not effective and research productivity was limited. One of the major reasons was "no periodic studies have been made to seriously evaluate research directives and priorities at higher-learning institutions" (Bekele, 1995, p.1).

The establishment of graduate level education in 1978/1979 was thought to solve the research needs of the country. However, it was not planned wisely and graduate programs were operating with the undergraduate budget (Bekele, 1995). Both undergraduate and graduate programs suffered for lack of budget and overworked senior faculty. It was with the help of Swedish Agency for Research Cooperation with Developing Countries (SAREC) that the graduate program at AAU operated for a long time. Before 1979, AAU did not offer graduate level education for various reasons. One of the reasons was due to shortage of qualified staff or inadequacy of facilities (Amare, 1982). The university directed all its resources "...to the production of large numbers of university-trained personnel with strong first degrees rather than disperse its energies and resources in postgraduate programmes for a few students" (Amare, 1982, p. 69). There were governmental and non-governmental assistance for those who wanted to pursue their postgraduate education abroad.

A research and publication office (RPO) was established to support "research endeavors, preparation of teaching materials, production of journals, proceedings and other scholarly publications, organization of seminars, workshops, conferences, symposia, organization of bilateral and multilateral arrangement to get funds and conduct research programmes in AAU" (Bekele, 1995, p.15). When Endashaw Bekele took the responsibility of running the RPO, he immediately assessed the current status of research and started to compile a bibliographic list of publications from 1980-1995 (Bekele, 1996). He was able to produce the first volume but his plan to publish three more volumes of the list of publications never materialized. Bekele continued to present papers and write about the status of research at Addis Ababa University.

After a thorough investigation of research related issues with more access to internal documents and policies, Bekele (1995, p. 87), summarized the major challenges of research in higher learning institutions in Ethiopia as follows:

> ...weak research infrastructure, inadequate support staff, poor administrative support, heavy teaching load, insufficient funding, lack of incentives and interest, poor working relation with development-oriented government offices, absence of independent career structure and lack of disseminating research results in the various vernacular languages, poor documentation system of research results, lack of clear research policies, experienced leadership and demoralization of many academic staff and lack of close attention to the necessary basic knowledge for sustainable research development.

In his writings, Bekele, suggested possible solutions and motivations to engage faculty in research.

In 1997, AAU carried out an internal review at every level of the institution. The review aimed at "evaluating the then position of the University with respect to general educational programs, organizational structures, staff profiles, student enrollment, research and publication, and other related issues in the programs" (AAU, 2008a, p. 7). Following the recommendations from the taskforce further steps were taken to have a strategic plan. At the dawn of the 21st century AAU took the initiative to implement business process re-engineering (BPR) and assigned a taskforce to assess the various parts of the institution. The reports of the different taskforces were compiled and published for internal use by 2002 and 2003. In 2008 another institutional self-evaluation report was published by members of the six taskforces. The taskforces reported that the heavy teaching load, lack of funding, poor research facilities, lack of rewards, and non-existent conducive working environment are the major obstacles to research.

Recently, institutional research progress evaluation was directed by the Associate Vice President for Research and Graduate Program (AVPRGP) and the findings were published in 2006. AVPRGP asked all academic departments to make an internal review of research for the years 1995-2005. In a report compiled by the AVPRGP all colleges, institutes, faculties, and schools reported faculty research performance in their respective unit and their suggestions to improved practice. Almost all units within the university reported the major hurdles faced by faculty as they tried to conduct research. Most of the challenges raised by Bekele in 1995 were still major hindrances to faculty research productivity after ten years. In March 2008, the Business Process Re-engineering research core committee was given the mandate to assess and report the current practice of research at Addis Ababa University. The committee identified five major problems and 24 problems causing the major problem and provided a proposed solution for improved practice (AAU, 2010a). The self-evaluation process is cyclical and the newly identified problems are major setbacks discussed by Bekele and the task forces' reports.

The strategic plan clearly stated that AAU is moving towards becoming a research and graduate school oriented institution (AAU, 2008). Faculty members are required to be scholars to conduct research for the advancement of knowledge. AAU has set the standard for work load and promotion policy that guides the overall operation of the university faculty. The university legislation (2009) states that faculty members are required to teach, research, and provide service. Publication is one of the requirements for promotion. AAU faculty members are encouraged to disseminate their research findings and this is reflected in the legislation (2009):

> An academic staff has the right to disseminate his research findings within or outside the University through any media. He shall also have the right to demand the establishment

of media for the dissemination of his findings, where such appropriate media do not exist, subject to availability of resources. (Article, 27.1)

At Addis Ababa University faculty members are hired based on set criteria by the institution and the specific department and their contract is renewed every two years. Faculty are evaluated twice a year (at the end of every semester) by students, colleagues and department heads. If they fail to fulfill the criteria their contract will not be renewed (Wondimu, 2003, AAU, 2009). Promotion is based on academic preparation, publication in reputable journals, teaching effectiveness, and service. One of the most difficult tasks for AAU faculty is publication (Wondimu, 2003). Their merit is dependent on their rank. A fulltime faculty is required to teach twelve hours every semester and engage in research. AAU faculty with a research project are required to teach nine credit hours every semester.

In summary, the literature review presented variables that predict faculty research productivity. It has also discussed research activities at AAU and the regional and institutional environment of the university. In the next chapter the study outlines the research design and procedures for the analysis of data.

CHAPTER 3

METHODS AND PROCEDURES

This study used a quantitative research design to analyze and interpret faculty research productivity at AAU. This study intended to analyze two research questions: (1) How productive are the faculty of AAU in research? (2) What are the differential predictive effects of individual and environmental variables on faculty research productivity?

Method

The survey instrument used in this research was developed by Blackburn and Lawrence (1995). Some modifications are made to contextualize it to the Ethiopian context. The author of the survey instrument gave permission to use the Faculty at Work instrument for this study. In addition, an open ended qualitative question was added to get faculty insight about research productivity to illustrate the quantitative findings. Multiple regression (hierarchical multiple regression) was used to analyze the data in research productivity at AAU faculty. Multiple regression is a statistical analysis used to explain the magnitude of the relationship between a dependent (criterion, outcome) variable and two or more independent (predictor) variables (Pedhazur, 1997). It can handle interval, ordinal and categorical data. It also provides an "estimates of both the magnitude and statistical significance of the relationship between variables" (all, all, org, 2003). This method is used to partition the sources of variance in the dependent variable that is accounted for the independent variables. Researchers look at the multiple correlation coefficient (R^2) to explain the variance in the dependent variable and they also consult beta weights and structure coefficients to partition the individual contribution of the predictor variables.

Participant Characteristics

The population of this study was faculty members at Addis Ababa University. According to the university's academic staff list for the 2009 academic year (AAU, 2009a) there were 2078 faculty (staff) members. It is important to note that only 1918 have an academic rank between graduate assistant and professor. All faculty members in the list were not present at the time of the study. The list is updated at the end of every academic year and it reflects faculty members who were teaching during the previous academic year. The staff list also included faculty who are away on sabbatical, study abroad leave, or who are not present for various reasons. Table1 summarizes the faculty distribution by sex, academic rank and citizenship.

Table 1

Number and Percentage of AAU Faculty by Demographic Variables

sociodemographic and career variables	*N*	%
Sex		
Males	1847	88.88
Females	231	11.12
Academic rank		
Graduate Assistant	104	5.47
Assistant Lecturer	153	7.97
Lecturer	847	44.16
Assistant professor	520	27.11
Associate professor	199	10.37
Professor	95	4.95
Citizenship		
Ethiopian	1951	93.99
Expatriate	127	6.11

Note. Adapted from Addis Ababa University Academic Staff Profile (2008/2009), by Office of the Associate vice president for Academic affairs, 2009.

As indicated in Table 1 the majority of AAU faculty are male (88.88%), Ethiopian (93.99 %), and lecturers (44.18%). Women (11.12%), professors (4.9%), and expatriate (6.11%) faculty members represent a smaller percentage of the university faculty.

Procedures for the Collection of Data

AAU faculty members were informed, by a cover letter included with the questionnaire, about the purpose and procedures of the study. They were also told that the survey will take about 45 minutes. Answering the questions in the survey involved no foreseeable risks. Participation was voluntary and they may stop at any time without penalty. By completing the survey faculty members gave consent to participate and confirmed that they are a faculty member at Addis Ababa University. The results are not used to report on a particular faculty member. Results of the survey are reported only on a group basis. All surveys were conducted at their leisure with the desired measures of confidentiality at the faculty member's discretion.

The survey was delivered, with a sealed envelope, to AAU faculty members by hand. The distributed questionnaires were collected in person at the completion of the survey to ensure the highest level of response rate. Mailing a survey to Ethiopia costs a lot of money, take a long time, and there are a number of other factors that may limit the response rate (e.g. acquiring mailing information). Survey by email could have been an option but because of slow internet connection and other related issues (e.g. access to computers and internet connection) there would have been a challenge to get enough data to analyze. Not all faculty members have access to the internet or have an email account. There is a very low band connection and faculty members have to pay to access the internet. It takes a long time to download an attached word document. In addition, collecting data by email excludes those who do not use computers as well as those with limited access to it.

There were advantages of delivering it by hand. First, there was assurance that the survey was delivered to all available AAU faculty. Second, if faculty members have questions about the survey, the principal investigator was available to explain. Previous studies indicate that there is

a historic low response rate from African scientists (Teferra, 2003a) and personal presence appealed for more response from study participants. This study attempted to investigate research productivity in an institution where faculty members were engaged in heavy teaching load and research is geared towards key national issues. As a result faculty may not have published as much as they would like to. It is also important to note that distributing a survey through department heads and immediate administrators could create discomfort to faculty members. The survey began on January 1, 2010 and faculty members were visited two or more times to collect the completed survey. The goal was to get a stable regression equation that represents the university faculty. The researcher attempted to deliver the survey to available faculty members and collected 298 questionnaires.

The Instrument

The survey instrument, Faculty at work*,* used in the present study was developed by Blackburn and Lawrence (1995). The questionnaire was designed to assess faculty role performance (teaching, research, scholarship, and service activities) by collecting data on demographic characteristic, career experience information, an assessment of themselves, and perceptions of their environment. Blackburn and Mackie (1992) did a test-retest reliability analysis of the instrument and reported, "For the entire test-retest analysis, correlations ranged from highs of roughly $r_s = 0.95$ to a low of $r_s = 0.13$" (p. 28). A detailed discussion of the test-retest analysis of the instrument is presented by Blackburn and Mackie (1992, pp. 28-29). The instrument has been used by scholars to study faculty role performance (Hughes, 1996; Sopatanarote, 2008). Sopatanarote (2008) did a pilot study using the Faculty at work instrument and reported a reliability coefficient of 0.91 (Cronbach's alpha). Carol Hughes (n.d.) conducted a confirmatory factor analysis research by using the instrument and concluded:

> The data reported herein confirm and refine many of the latent variables identified by Blackburn and Lawrence which are used as the basis for their theoretical framework and the *Faculty at work* questionnaire. To the extent that the factors discussed in their work map closely to those confirmed in this study, their conclusions about the role these factors play in faculty productivity are supported. The factor structure identified in this study may provide an even stronger basis for future analysis of the role these variables play in faculty publishing productivity. (p. 15)

There were few modifications made to the original instrument. Blackburn and Lawrence studied both faculty and administrators and they have explored the three roles of faculty (teaching, research, and service). The focus of this study was only faculty research productivity. Therefore, in this study, some sets of items dealing only with teaching or service were excluded from the original instrument (e.g. 3a-i; 6a-e; 7a-g; 10a, b; 14). Blackburn and Lawrence also studied multiple institutions and two years of faculty performance. This study only focused on one institution (AAU) and five years of research activities are examined (September, 2004-August, 2009). Some items were contextualized to fit the Ethiopian environment. The item asking about race was changed to ask citizenship of the university faculty. Rating of graduate institution was modified to higher institution attended to local, foreign, or sandwich. The disciplines were only categorized to either natural science or social science. Age was also asked as a chronological age as of January, 2010. Because of the difference between the Ethiopian calendar and the western world, this study tried to avoid the confusion that might arise from the unconscious reporting of inconsistent year of birth. An additional qualitative question was added to get insight in the interpretation of the quantitative findings.

The questionnaire has ten sets of items. The first set of questions has a group of items about the work environment. This set of questions collected information about how faculty perceive their work environment. It included their view of organizational climate, organizational relationships, faculty commitment, support services, and student preparedness. The second set of items was about the level of influence faculty have on institutional decisions. It assessed the level of influence faculty have on personnel decision making, personal control of career, and student admission decision making influence. The third set was about faculty scholarly activities during 2008-2009 academic years. The items examined how faculty were engaged in campus and school communication, research communication with off campus peers, and in teaching, conference, and workshops. The fourth set collected data on research behavior of the university faculty during the specified period. Items included journal publishing and conference presentation, professional writing and organizational activities, and grant report and popular press writing.

The fifth set of items included personal information about sociodemographic background (sex, age, citizenship), career related variables (rank, highest degree earned, etc.), satisfaction, research support, grants, publications and fellowships. The sixth set of questions has seven items about credence of feedback from colleagues, administrators, students and alumni. The seventh set has three subsections (7a, 7b, and 7c). There were a total of 70 items about skills, beliefs/attitudes/values, and personality characteristics the institution values and it also assessed faculty self competence. The eighth group of items has faculty view of administrators and the ninth set included items about percentage of effort to each role (teaching, scholarship, research, and service), time allocation, class size, dissertation advising and chairing behaviors. Finally, there is one open-ended question about research productivity at AAU.

Study Variables

As it was presented in the theoretical framework, there are six sets of independent variables: sociodemographic, career, self knowledge, social knowledge, behavior, and environmental response. Even if the theoretical framework included environmental conditions and social contingencies, they were not analyzed in this study. The number of publications by the university faculty during the past five years (September, 2004- August, 2009) was the dependent variable (see questionnaire). This provided an examination of clear products of research productivity. AAU faculty members were asked to provide a frequency count of articles, reports, books; journal reviews; book chapters, etc. They were also asked to provide scholarship, grant, and fellowship activities. The items that were directly related to research productivity were analyzed. Other items were used to compare other faculty roles with research productivity. The variables used in the regression analyses are listed below.

Sociodemographic Variables

Sex: Male or female

Age: Chronological age

Citizenship: Ethiopian, Ethiopian by birth but hold foreign nationality, non-Ethiopian foreigner.

Career Variables

Discipline: Academic discipline, specialization, field of study

Degree: Bachelors, masters, doctorate

Institution: Where faculty earned their highest degree (local, abroad, or sandwich)

Rank: Assistant lecturer, lecturer, assistant professor, associate professor, professor, and other

Publication record: published work before September 2004 .Five year publication (5cc) subtracted from total publication over career (5dd and 5ee)

Career age: Number of years as a faculty member

Self Knowledge (self-valuation)

Self-competence: How characteristic obtaining grants is of you; how characteristic publishing is of you.

Self-efficacy: How much influence you have on having your writing accepted for publication; how much influence you have in obtaining money for travel to professional meetings beyond the standard institutional allowance.

Interest: Do your interests lie primarily in teaching or research?

Social Knowledge (perception of the environment)

Credence to feedback: How much credence you give to your chair or dean's comments on your scholarly activities; how much credence you give to your colleagues' (faculty members in your unit) comments on your scholarly work.

Physical/collegial support: The extent to which it is true that the support services available at your institution for your scholarship help you to conduct the kind of inquiry you desire; the extent to which it is true that your unit's colleagues know your specialty well enough to assist and critically review your scholarly work.

Financial support: Whether your (your project) have received research support from any of the following sources in the past five years: institution or department; federal agencies; state or local government agencies; Non-governmental agencies; private foundations; private industry; other.

Collegial commitment: The extent to which it is true that faculty in your unit and institution are more committed to the teaching of their discipline than they are to adding to their discipline's knowledge base.

Institutional preference: The percentage of time you believe your institution would prefer that you spend on research activities.

Behavior

Behavior: Current effort on research; how many grant have you submitted in the past five years; how frequently you have submitted a research proposal to a government or private agency; how frequently you have written a research report for an agency, institution, or other group.

Environmental Response

Journal Editorial: How frequently Reviewed articles for a professional journal; served on an editorial board of a journal.

Clerical assistance: Number of hours of clerical assistance you get per week.

Student assistance: Number of hours of student assistance you get per week.

Predictor variables are entered in the regression analyses and the output is interpreted by following appropriate statistical analyses to explain the variation in faculty research productivity.

Procedures for the Analysis of Data

The questionnaire was coded and entered into Statistical Package for the Social Sciences (SPSS) software. After data screening was performed to examine missing values and ensure the assumptions were met, a descriptive data analyses was used to explore the level of research productivity by sociodemographic (age, sex, citizenship) and career variables (e.g. rank, discipline, and institution attended). Publication output was regressed on the six sets of predictor variables. To determine the differential predictive effects of each set of variables on publication

output, a hierarchical regression analyses was conducted. The hierarchical regressions was performed by entering each set of variables as a block in the following order; 1) sociodemographic, 2) career, 3) self-knowledge, 4) social knowledge, 5) behavior, and 6) environmental response.

At the end of the questionnaire there was an open ended item to collect faculty perceptions about research productivity. Faculty response to that open ended questions was analyzed to enrich the interpretation of the research in the discussion section. Teaching, scholarship and service related items were analyzed in their relation to faculty research performance.

Reporting of the Data

Research findings will be available to study participants through AAU administration. The research will be presented at conferences of professional associations and it will be published in a journal to make the findings available to researchers and interested readers.

CHAPTER 4

ANALYSIS OF THE DATA

This chapter presents the results of the faculty research productivity study.

Data Screening and Descriptive Results

Four hundred questionnaires were distributed to the university faculty and 298 questionnaires were returned resulting in a 74.5% response rate. Out of the 298 cases, 11 did not have relevant information and one only responded to the qualitative question. Once the 12 cases are excluded from further analysis pairwise deletion strategy was used for the remaining 286 case (71.5% response rate) to ensure the sample size would not be reduced. Residuals were inspected for normality, linearity, and homoscedasticity. Sactterplot of standardized residuals and standardized predicted values was assessed to examine the homoscedasticity assumption and there was no major deviation from normality. The standardized residuals were evenly distributed across the predicted values. A casewise diagnostics indicated that there are two outliers (Cases 31 and 218) with a standardized residual above 3.0.The model did not predict the two cases very well. The model predicted the number of publication for Case 31 to be 6.13 and Case 218 to 19.7. During the five year period these faculty members have a publication output of 20 and 38 respectively.

Study Participants by Sociodemographic Variables

Most of the faculty members in this study are men (M = 92.1%, F = 7.9%). The average age of AAU faculty is 44. More than 75% of AAU faculty are between the ages of 31-60 (31-40 = 25.3%, 41-50 = 28.6%, 51-60 = 23.4%) while 14.9% are between 21and 30 years old, and 7.8 % are between 61 and 75 years of age. The majority of the university faculty who participated in this study are Ethiopians (92.3%), with one Ethiopian (0.4) who held a foreign nationality, and

20 (7.3) non-Ethiopian foreigners (expatriates). Table 2 contains a descriptive statistics of study participants by sociodemographic variables.

Table 2

AAU faculty Study Participants by Sociodemographic Variables

Sociodemographic variables	*n*	%
Sex		
Males	258	92.1
Females	22	7.9
Age		
21-30	40	14.9
31-40	68	25.3
41-50	77	28.6
51-60	63	23.4
61-75	21	7.8
Citizenship		
Ethiopian	254	92.3
Ethiopian by birth but hold foreign nationality	1	.4
Non-Ethiopian/foreigner	20	7.3

Study Participants by Career Variables

The majority of survey respondents hold an academic rank of lecturer (36.2%). The second largest number of faculty are assistant professors (27.6 %). There are 19% associate professors and a small number of professors (10.4%). The remaining 19% hold various ranks (Graduate assistant, visiting professor, and professor emeritus). The sample distribution of AAU faculty by discipline shows that 49.3% are in the natural sciences and 50.7% are in the social sciences. The educational preparation of faculty also shows that 5.7% hold a bachelor's degree, 44.4% earned a masters degree and 49.8% hold a doctorate degree (PhD, EdD, MD, DVM, DSc, etc.).Table 3 displays study participants by career variables.

Table 3

AAU faculty study Participants by CareerVariables

Sociodemographic and career variables	*n*	%
Discipline		
Natural science	135	49.3
Social science	139	50.7
Institution highest degree earned		
Local	114	41.6
Abroad	153	55.8
Sandwich	7	2.6
Highest degree earned		
Bachelors	16	5.7
Masters	124	44.4
Doctorate	139	49.8
Academic rank		
Lecturer	101	36.2
Assistant professor	77	27.6
Associate professor	53	19.0
Professor	29	10.4
Other	19	6.8
Career age (years)		
<6	67	24.3
6-10	60	21.7
11-15	31	11.2
16-20	38	13.8
21-25	24	8.7
>25	56	20.3

Career age refers to the number of years as a faculty member. More than 46% of respondents have ten years or less of experience as a university faculty member. About 25% of them were faculty members between 11 and 20 years. The remaining 29% were faculty for more than 20 years. We have examined the survey respondents by sociodemographic and career variables. Next, the study now explores a descriptive analysis of study participants by self-knowledge variables.

Study Participants by Self Knowledge Variables

The self knowledge variables are different from sociodemographic and career variables. Unlike the sociodemographic variables, self knowledge variables change over time and they have a potential to fluctuate. The self knowledge variable set includes the following variables: interest, preference to a role, commitment, self efficacy (competence and influence), and psychological characteristics. Tables 4 through Table 14 contain data about self knowledge variables. A frequency count (n) of responses for each category and the percentage value (%) is presented in each table.

Interest and Preference to a Role

Faculty allocate their effort to something that interests them. AAU faculty were asked to indicate where their interests lie in research or teaching. If they are interested in both toward which they lean. Table 4 contains a frequency count of their response and its percentage.

Table 4

Interest in Teaching and Research

Do your interests lie primarily in teaching or research?	*n*	%
Very heavily in research	25	9.0
In both, but leaning towards research	148	53.2
In both, but leaning towards teaching	89	32.0
Very heavily in teaching	16	5.8

Personal Preference

In addition to indicating where their interests lie in research, teaching or both, AAU faculty, were asked to indicate their preference to faculty roles teaching, research, scholarship, and service). Table 5 displays the total number of respondents for each role (*n*), the mean percentage value (*M%)* and standard deviation (*SD)*.

Table 5

Faculty Preference to a Role (%)

Personal preference	*n*	*M %*	*SD*
Teaching	238	41.04	13.97
Research	239	16.65	11.02
Scholarship*	238	31.78	12.07
Service	239	10.48	7.34

**Definition of terminology retained from Blackburn & Lawrence (1995).*

Commitment to Research

Survey respondents were asked to indicate a valued faculty at Addis Ababa University that is committed to research. Then they were asked to indicate their level of commitment to research. Table 6 presents a frequency count and percentage of faculty self-report on commitment to research.

Table 6

Faculty Self Report on Commitment to Research (%)

How characteristic?	*n*	%
Not at all	8	3.2
Slightly	49	19.8
Somewhat	102	41.1
Highly	89	35.9

Self-Efficacy (Competence)

Publication and obtaining grants are indicators of research competence. AAU faculty members were asked to indicate how characteristic it was for them to obtain grants and to get something published. Their response is presented in Tables 7 and 8. Table 7 contains faculty self-report on how characteristic it is to obtain grants. Table 8 indicates how characteristic it is for faculty to publish.

Table 7

Faculty Self-Report on Obtaining Grants (%)

How characteristic?	*n*	%
Not at all	4	1.7
Slightly	14	5.8
Somewhat	96	39.8
Highly	127	52.7

Table 8

Faculty self-Report on publishing (%)

How characteristic?	*n*	%
Not at all	36	14.9
Slightly	57	23.6
Somewhat	96	39.7
Highly	53	21.9

Self-Efficacy (Influence)

Faculty reported the level of influence they have to get something they have written accepted for publication. They were also asked to report how much influence they have to obtain money for travel to professional association meetings (beyond standard institutional allocations). Their response ranged from really none, minor, some, and substantial. Table 9 contains faculty self-report on the level of influence they have on publication. Table 10 presents self-report of faculty level of influence to obtain travel grant. The tables present a frequency count and the percentage of their response.

Table 9

Faculty Self-Report on Influence on Publication (%)

How much influence?	*n*	%
Really none	38	14.6
Minor	53	20.4
Some	92	35.4
Substantial	77	29.6

Table 10

Faculty Self-Report on Influence on Obtaining Money for Travel (%)

How much influence?	*n*	%
Really none	126	45.8
Minor	43	15.6
Some	52	18.9
Substantial	54	19.6

Psychological Characteristics (Personal Disposition for Research)

The theoretical framework postulates, "...personal dispositions relate to the amount of effort given to the different faculty roles" (Blackburn and Lawrence, 1995, p. 90). Successful faculty members secure external funding to finance their research. However, there are more applicants than the amount of funding available to researchers. Faculty members with ambitious, competitive, and perseverant characteristics are better in obtaining grants. In the framework the three psychological attributes are labeled as "personal disposition for research" (p. 90). Tables 11, 12, and 13 present self assessment of faculty how ambitious, competitive, and perseverant they are.

Table 11

Faculty Self-Report on Being Ambitious (%)

How characteristic?	*n*	%
Not at all	21	8.6
Slightly	35	14.3
Somewhat	85	34.8
Highly	103	42.2

Table 12

Faculty Self-Report on Being Competitive (%)

How characteristic?	*n*	%
Not at all	11	4.5
Slightly	28	11.4
Somewhat	95	38.6
Highly	112	45.5

Table 13

Faculty Self-Report on Being Perseverant (%)

How characteristic?	*n*	%
Not at all	6	2.6
Slightly	21	9.2
Somewhat	100	43.9
Highly	101	44.3

Satisfaction and Morale

AAU faculty were asked to indicate their level of satisfaction in their career, the institution they work in, and whether they would become a faculty member if they were to begin their career again. Their response to the three items is displayed in Table 14.

Table 14

Satisfaction of Career and Institution

How successful do you consider yourself in your career?	*n*	%
Very successful	87	31.3
Fairly successful	154	55.4
Fairly unsuccessful	23	8.3
Very unsuccessful	14	5.0
How do you feel about AAU?		
It is a very good place for me	43	15.7
It is a fairly good place for me	194	70.8
It is not the place for me	37	13.5
If you were to begin your career again, would you still want to be a faculty member?		
Definitely yes	135	49.1
Probably yes	77	28.0
Probably no	42	15.3
Definitely no	21	7.6

Study Participants by Social Knowledge Variables

Social knowledge variables assess faculty perception of their work environment. The variables are social support, material support, and perceived institutional preference.

Credence

Faculty receive feedback from colleagues who work with them, students, alumni, and administrators. Table 15 contains the level of credence faculty give to comments from their chair

or dean about their scholarly activities. Table 16 also shows the level of credence given to colleagues' (faculty members in their unit) evaluation of their scholarly work.

Table 15

Credence of Feedback from Chair/dean on Scholarly Activities

Credence	*n*	%
Never received	85	32.4
Little or no credence	27	10.3
Some credence	31	11.8
A moderate amount of credence	72	27.5
A great deal of credence	47	17.9

Table 16

Credence of Feedback from Colleagues' *on Scholarly Work*

Credence	*n*	%
Never received	62	23.8
Little or no credence	19	7.3
Some credence	44	16.9
A moderate amount of credence	85	32.7
A great deal of credence	50	19.2

Social Support

Another item asked faculty to indicate the degree of truthfulness of the intellectual climate of the institution and the collegial support within their unit. Table 17 contains faculty response to the support services available at AAU to help faculty conduct the kind of inquiry they desire. Table 18 presents the degree of truthfulness that their unit's colleagues know their specialty well enough to assist and critically review their scholarly work.

Table 17

Intellectual Climate

Degree of truthfulness	*n*	%
Little or no truth	89	33.3
Generally not true	109	40.8
Generally true	64	24.0
very high degree of truth	5	1.9

Table 18

Colleague Review of Scholarly Work

Degree of truthfulness	*n*	%
Little or no truth	56	20.4
Generally not true	87	31.6
Generally true	111	40.4
very high degree of truth	21	7.6

Collegial Commitment

Faculty members work with their peers and they assess their colleagues' commitment by their involvement in different activities. This is explored at institutional and departmental level. Table 19 contains faculty response to indicate the degree of truthfulness to the statement, "The faculty in my unit are more committed to the teaching of their discipline than they are to adding to their discipline's knowledge base." Table 20 also presents faculty response to the statement, "The faculty in this institution are more committed to teaching than they are to doing research in their disciplinary domain."

Table 19

Colleague Commitment at Department (unit) Level

Degree of truthfulness	*n*	%
Little or no truth	29	10.6
Generally not true	49	17.9
Generally true	156	56.9
very high degree of truth	40	14.6

Table 20

Colleague Commitment at Institutional Level

Degree of truthfulness	*n*	%
Little or no truth	17	6.1
Generally not true	46	16.6
Generally true	146	52.7
very high degree of truth	68	24.5

Material Support/Financial Support

Research costs money and most of the time the financial resources of any institution will not totally address the financial needs of faculty. Financial support in the form of seed money encourage faculty to start a research project but faculty members look for more resources within and outside the institution. Table 21 contains the percentage of responses to seven sources of funding. It indicates the sources of funding and faculty response whether they have acquired funding from these sources or not. The table also presents the average number of publication output by Addis Ababa University faculty with their status of whether they have received funding from the list of sources.

Table 21

Source of Funding

Funding source	Yes	publication	No	publication
	%	*M*	%	*M*
Institutional or departmental funds	39.2	5.94	60.8	3.12
Federal agencies	10	8.91	90	3.69
State or local government agencies	10.4	5.75	89.6	4.05
Non-government organizations	34.6	5.95	65.4	3.30
Private foundations	8.7	10.9	91.3	3.70
Private industry	5.9	6.92	94.1	3.90
Other	23.1	7.79	76.9	3.30

Institutional Preference/ Perceived Institutional Preference

Faculty have their own perception of how the institution want them to distribute their time to teaching, research, scholarship and service. They were asked to indicate their perception of institutional preference to faculty roles. The percentage of time is displayed in Table 22.

Table 22

Perception of Institutional Preference to Faculty Roles

My perception of institutional preference	*N*	*M* %	*SD*
Teaching	239	60.05	20.17
Research	235	8.60	9.42
Scholarship	236	21.42	14.80
Service	234	9.93	11.12

Study Participants by Behavior Variables

Behavior variables include grant proposal submission activities to various agencies for the five year period and over the course of their career. Percentage of effort given to current

faculty research is also an indicator of faculty behavior. Tables 23 through 25 contain the results of behavior variables.

Table 23

Submitted and Written Proposals

How frequently you have done each of the following (2004-2009)?	Never	1-2 times	3-4 times	5-10 times	More than 10 times
Submitted a research proposal to a government or private agency	84	107	55	23	6
Written a research report for an agency, institution, or other group	102	88	55	21	8

Table 24

Grant Proposals for Five Years and Over Career

Grant proposals	*N*	*M*	*SD*	Max	Total
Grant proposal submitted five years	252	1.845	2.169	12	465
Grant application over career	241	3.875	5.637	30	934

Table 25

Current Research Effort

percentage of time for the faculty roles	*N*	*M* %	*SD*
Current			
Teaching	249	53.47	20.00
Research	246	15.11	13.74
Scholarship	245	17.38	15.93
Service	248	14.83	13.63

Study Participants by Environmental Response Variables

The environmental response variables include environmental incentives that recognize faculty productivity. It could be promotion, tenure, a merit raise, clerical support, more money to

travel for conferences, a graduate assistant. Environmental response can be also reviewing research articles for a professional journal, and serving in an editorial board of a journal. There is no tenure system at AAU and there was no merit raise for most faculty members. In this study, clerical assistance, student assistance, review of journal articles, and membership in an editorial board of a journal are analyzed. Table 26 contains the number of hours in clerical and student assistance. Table 27 presents the number of times faculty have reviewed articles to a professional journal and the number of times they served in an editorial board of a journal.

Table 26

Clerical and Student Assistance

Assistance in hours	*n*	%
Clerical assistance		
0	137	77.8
.5-10	31	17.6
11-20	6	3.4
21 -100	2	1.1
Student assistance		
0	125	66.8
.5-10	54	28.9
11-20	7	3.7
21 -100	1	.5

Table 27

Article Review and Serving on an Editorial Board

How frequently you have done each of the following (2004-2009)?	Never	1-2 times	3-4 times	5-10 times	More than 10 times
Reviewed articles for a professional journal	116	54	51	38	17
Served on an editorial board of a journal	187	47	22	10	8

Tables 2 through 27 showed descriptive results of the study by following the six sets of predictor variables. Next, descriptive and regression results of the study will be presented with the research questions.

Research Question 1

How Productive are the Faculty of AAU in Research?

The university faculty were asked to report a frequency count of their submitted and published works (articles, books, monographs, etc) during 2004-2009 and over the course of their career. They were also asked to report research, funding, and proposal submission activities during the five years. Table 28 summarizes the number of grant and fellowship applications, and number of publications. The second column is the total number of study participants responded to each item. Then the mean and standard deviation follow. Column four is the maximum number of grants, fellowships, or publications submitted or published by a faculty member. And the final column reports the total number of each research and scholarship activity.

Table 28

Grants, Publications, and Fellowships

Grants, publications, and fellowships	*N*	*M*	*SD*	Max	Total
Grant proposal submitted five years	252	1.845	2.169	12	465
Fellowship application five years	253	1.636	3.109	30	414
Grant application over career	241	3.875	5.637	30	934
Fellowship application career	235	2.842	4.961	50	668
publication five years	253	4.166	5.990	40	1054
publication career	259	11.123	24.058	261	2881
Book and monograph published over career	252	1.757	2.998	20	443

Publication Output by Sociodemographic and Career Variables

The five year publication output was further analyzed by sociodemographic and career variables. The five year publication rate by AAU faculty is presented in Table 29. The first column contains the list of variables. The second and third columns present the mean and standard deviation of five-year publication rate. The fourth column shows the maximum number of publication by individual faculty within that category.

Table 29

Five Year Publication Frequency Count by the Predictor Variable Sets

Sociodemographic and career variables	*M*	*SD*	Maximum
Sex			
Males	4.26	6.06	40
Females	3.05	5.03	20
Age			
21-30	1.14	2.33	10
31-40	3.40	4.13	20
41-50	3.84	4.57	20
51-60	6.56	8.84	40
61-75	5.76	7.05	25
Citizenship			
Ethiopian	4.11	6.08	40
Ethiopian by birth but hold foreign nationality	-	-	-
Non-Ethiopian/foreigner	5.77	5.55	20
Discipline			
Natural science	5.30	7.22	40
Social science	2.90	3.92	30
Institution highest degree			
Local	1.88	3.10	15
Abroad	5.52	6.61	40
Sandwich	9.25	14.08	30
Highest degree earned			
Bachelors	.53	1.39	5
Masters	2.05	2.84	14
Doctorate	6.26	7.25	40
Academic rank			
Lecturer	1.30	1.75	9
Assistant professor	3.54	3.31	13

(Table continues)

Table 29 (continued)

Sociodemographic and career variables	*M*	*SD*	Maximum
Associate professor	7.94	8.17	40
Professor	9.75	9.19	38
Other	1.06	3.08	12

Faculty Publication and Research Activities

Faculty members also reported how frequently they have done additional research activities during the five year period. The majority of AAU faculty who participated in this study never engaged in the listed research activities. Publication and proposal submission related items are used to predict research productivity. Table 30 shows how frequently AAU faculty have done the research activities during the five year period.

Table 30

Faculty Publication and Research Activities

How frequently you have done each of the following (2004-2009)?	Never	1-2 times	3-4 times	5-10 times	More than 10 times
Submitted an article for publication in an academic or professional journal	76	94	50	35	21
Made a presentation at a professional conference	72	89	52	46	14
Written for the popular press	205	48	14	2	5
Published chapters in a book	180	64	22	4	2
Reviewed articles for a professional journal	116	54	51	38	17
Organized a professional meeting	127	94	31	17	4
Edited the proceedings of a professional meeting	170	58	36	7	3
Submitted a research proposal to a government or private agency	84	107	55	23	6
Written a research report for an agency, institution, or other group	102	88	55	21	8
Served on an editorial board of a journal	187	47	22	10	8
Published scholarly articles	98	83	46	28	19

Faculty Scholarship Activities

In addition to reporting the number of their publications and their research related performance AAU faculty members were asked to report how often they have done scholarly activities during the previous academic year. Definition of scholarship is retained from Blackburn and Lawrence (1995). Even if scholarship activities may not result in published work, conference presentation and conversations regarding research important part of the research endeavor of faculty. Their response range from never to more than ten times. Table 31 presents the results of faculty scholarly activities.

Table 31

Faculty Scholarship Activity

How often you have done the following during the last year?	Never	1-2 times	3-4 times	5-10 times	More than 10 times
Attended a visiting lecturer's presentation on campus	40	114	73	40	11
Presented your ongoing work on campus	146	97	21	5	2
Served as a guest on a local radio or television station	204	50	10	6	5
Attended a campus seminar where a colleague was presenting her or his work	33	112	84	30	18
Had informal conversations about research with colleagues at professional meetings	31	93	71	45	34
Attended a campus workshop on teaching	103	115	41	12	4
Had telephone conversations with colleagues to discuss your scholarly activities.	90	71	47	34	32
Gone off-campus to attend a meeting on the teaching of your discipline.	128	96	31	13	6

Research Question 2

What are the Differential Predictive Effects of Individual and Environmental Variables on Faculty Research Productivity?

Publication output was regressed on the six sets of predictor variables. To determine the differential predictive effects of each set of variables on publication output, a hierarchical regression analyses was conducted. The hierarchical regressions was performed by entering each set of variables as a block in the following order; 1) sociodemographic, 2) career, 3) self-knowledge, 4) social knowledge, 5) behavior, and 6) environmental response. The result was statistically significant, F (41, 114) =5.801, p<.001, 95% CI [-8.048, 22.927] with a large effect of R^2 = .676. The adjusted R^2 was .559, indicating the shrinkage due to a theoretical correction for sampling error. Table 32 displays the regression summary table. All sets of variables, but behavior, produced statistically significant changes in the explained variance.

Table 32

Differential Predictive Effects of the Variable Sets

Predictor variable sets	*R*	R^2	*Adj.* R^2	*SE*	ΔR^2	ΔF	*df1*	*df2*	*p*
Sociodemographic	.271	.073	.055	5.82	.073	4.01	3	152	.009
Career	.549	.302	.259	5.15	.228	7.95	6	146	.000
Self-knowledge	.628	.395	.310	4.97	.093	2.09	10	136	.029
Social knowledge	.725	.525	.397	4.65	.130	2.39	14	122	.006
Behavior	.748	.560	.422	4.55	.035	2.33	4	118	.060
Environmental response	.822	.676	.559	3.97	.116	10.22	4	114	.000

Note. *R* = multiple correlation coefficient, R^2 = multiple squared correlation coefficient, *Adj.* R^2 = adjusted R^2, *SE* = standard error of the estimate, ΔR^2 = change in effect size, *df1*= degrees of freedom, *p* = statistical significance.

Table 33 shows the individual predictive effects of the variables on publication output. Both standardized beta weights and structure coefficients are presented. The first column shows the beta weights. Beta weights indicate the contribution of each predictor variable in explaining the dependent variable (publication). Structure coefficients also indicate the amount of variance explained by each predictor variable. It is always advisable to consult both coefficients in the analysis and interpretation of results in multiple regression. Third column shows *p* value.

Table 33

Predictive Effect of Individual Variables

predictor	β	r_s^2*100	*p*
Sociodemographic			
sex	-.054	.39	.39
age	.000	10.00	.99
citizenship	.038	.70	.55
Career			
discipline	-.025	6.68	.72
institution	.112	13.91	.13
highest degree	.093	20.18	.26
rank	.139	15.67	**.05***
career age	-.049	14.60	.62
publication record	.162	25.62	**.02***
Self-knowledge			
interest	-.118	10.10	.08
personal preference	-.026	7.91	.70
obtains grants	-.076	6.75	.27
publishes	.055	25.36	.47
obtain travel money	-.035	.00	.55
publication	-.080	1.87	.22
ambitious	-.058	.50	.43
competitive	-.024	4.28	.77
perseverant	.148	4.58	**.05***
committed to research	.017	22.35	.82
Social knowledge			
credence of feedback/chair	-.006	1.87	.94
credence of feedback/colleague	.042	3.95	.61
support resources	.001	.60	.99
support scholarship/critique	-.018	2.84	.75
institutional fund	-.047	8.01	.46
federal fund	-.114	10.64	.06
state fund	.136	1.16	**.03***
non-governmental organization	-.003	6.79	.96

(Table continues)

Table 33 *(continued)*

predictor	β	r_s^2*100	*p*
private foundation	-.151	16.47	**.01****
industry	-.056	2.32	.37
other	-.014	13.66	.83
faculty commitment/unit	-.052	.53	.40
faculty commitment/institution	.054	2.15	.43
perceived institutional	.048	11.06	.49
Behavior			
proposal to government/private	.031	27.67	.75
research report	.125	20.89	.20
proposal five years	.070	28.02	.39
current research effort	.191	18.20	**<.01****
Environmental response			
review of articles	.127	39.10	.17
editorial board of a journal	-.134	13.54	.06
hours of clerical assistance	.002	1.98	**<.01****
hours of student assistance	.396	25.29	.97

Note. *statistically significant at $p < .05$, **statistically significant at $p < .01$, r_s^2 = squared structure coefficients, β = beta weights, *p* = statistical significance.

This section of the study presented descriptive and regression results of the findings. In chapter five the study will discuss the findings, draw conclusions and implications, and suggest recommendations.

CHAPTER 5

DISCUSSIONS AND CONCLUSIONS

This research intended (1) to analyze the research productivity of Addis Ababa University faculty, and (2) to examine the differential predictive effects of individual and environmental variables on faculty research productivity. This study was based on, *Faculty at work*, a theoretical framework developed by Blackburn and Lawrence (1995). A hierarchical multiple regression was used to examine the ability of six sets of independent variables (sociodemographic, career, self knowledge, social knowledge, behavior, and environmental response) to predict research productivity (publication output).

Discussion of Findings

One of the significant findings of this study was sample collection. The data collection was difficult and time consuming, but it was a very effective method. Compared to the historic low response rate of African researchers discussed in the literature, the data collection method used in this study opened a new door to the world of data collection from African higher institution faculty. Delivering and collecting questionnaires in person could result in better response rate than earlier studies and it could help researchers to understand the research productivity of African scientists better.

A total of 400 questionnaires were distributed to Addis Ababa University faculty and the response rate was 74.5%. After questionnaires with missing data were removed a total of 286 (71.5%) cases are included in the analyses of the study. AAU faculty who participated in the study published (including submitted publications) a total of 1054 ($M = 4.166$, $SD = 5.99$) of their writings. They published 2881 ($M = 11.123$, $SD = 24.058$) of their work over the course of their career. The maximum number of publication by a faculty member during the five year

period was 40. The predictor variables explained 67.6% of the variance in five-year publication output by Addis Ababa University faculty members. As each group of predictors was entered into the regression, the amount of variance increased linearly. All variable sets, but behavior, produced a statistically significant change. The career variable set is the strongest predictor of the model accounting for 22.8% of the variance in publication output. Social knowledge and environmental response explained 13% and 11.6% of the proportion of the variance in publication output, respectively. Behavior explained 3.5%. Self knowledge accounted for 9.3% of the variance for the five year publication rate of AAU faculty. The sociodemographic variable set was able to explain 7.3% of the variance in research productivity. The findings are further analyzed by each predictor variable set.

Analysis by Sociodemographic and Career Variables

This analysis identified differences in publication output by sociodemographic variables and career variables. As it is indicated in the literature, men dominate the academic environment and AAU is not different. There are more men faculty than women faculty. Men, on average, published more than women. Older faculty (51-75) published more than all the other age groups combined. Citizenship showed that non-Ethiopians, on average, published more than Ethiopians. The publication rate by academic rank revealed that the most productive publishers are professors ($M = 9.75$) followed by associate ($M = 7.94$) and assistant ($M = 3.54$) professors.

Faculty members in the natural science field published ($M = 5.3$) more than those in the social science ($M = 2.9$). Educational preparation of faculty also indicated a difference in publication output. AAU faculty, with a doctorate degree, have an average publication rate of 6.26 for the five year period. Those who earned a masters degree published two, and faculty with a bachelor's degree have less than one publication. The higher institution where the university

faculty earned their highest degree also showed a difference in average research productivity. Faculty who earned their educational preparation within the country have less than two publications. Those who studied abroad have an average publication rate of 5.52. The most productive faculty are those who were trained in a sandwich program ($M = 9.25$). They were trained in collaboration with a local university and a university abroad.

When the three sociodemographic variables were entered into the regression, they were able to explain 7.3% ($R^2 = .073$) of the variance in the five year publication output of AAU faculty. The result is a statistically significant at $p < .05$. Further analysis of the sociodemographic variables indicated that sex explained only 0.3% of the variance. Age is the strongest predictor of the sociodemographic variables with an $R^2 = .070$ and it was statistically significant. Citizenship predicted nothing. Most of the variance in publication output was explained by chronological age. In this study, age was able to explain most of the variance in publication output explained by the sociodemographic variable set.

The career variable set is the strongest predictor of the regression model explaining 22.8% of the variance in publication output. When career variables were entered in the second block, after the sociodemographic variables, publication record appeared as the strongest predictor of the career variables followed by educational preparation (degree) and academic rank. The proportion of variance explained by discipline was 6.68%. Educational preparation (degree) explained 20.18% of the variance. Academic rank and publication record accounted for 15.67% and 25.62%, respectively. The type of institution attended revealed 13.91% of the variance in faculty productivity among the university faculty. Career age was able to explain 14.6% of the proportion of variance in publication rate. Most of the variance explained by the individual career predictor variables is a shared variance.

Analysis by Self Knowledge variables

Self-knowledge looked at what faculty know about themselves (self-valuation). The self knowledge variable set uniquely explained 9.3% of the total variance in publication output and the result was statistically significant (p <.05). If they are given an opportunity to choose, faculty members distribute their effort to what interest them. AAU faculty members have a preference to distribute their effort. They would like to spend 41.04% of their time teaching, 16.65% of their time researching, 31.78% of their time in scholarship activities, and the remaining 10.48% doing service. About 9% of AAU faculty said that their interest lies heavily in research and the average publication rate of this group for the five-year period is 6.9. About 5.8% are interested very heavily in teaching and their mean publication rate is less than one (0.46). The majority of AAU faculty members (85%) lean towards one role while interested in both teaching and research. Faculty members whose interest leans towards research have an average publication output of 4.8 and those leaning towards teaching published 2.6.

Self-competence (publishing and obtaining grants) was the strongest of all self-knowledge variables in explaining the proportion of the variance in publication rate. It explained 17.3%. The majority of survey respondents reported that obtaining grants (87.7%) and publishing (98.6%) is characteristic of them. Self efficacy (influence) explained almost nothing (0.1%). Faculty said that they have influence on getting something published. However, the majority of faculty reported they do not have any influence on obtaining money for travel beyond the standard institutional allocation (45.8%). The psychological characteristics Ambition /competitive /commitment to research) explained 2.8%. The majority of AAU faculty reported that the psychological characteristics accurately reflected them. Research interest explained 2.3% and it

was statistically significant. Preference for research (% of effort) explained very little (0.5%) and it was not statistically significant.

Commitment goes beyond interest. Faculty members that are committed to what interest them show their commitment through their activities. Faculty were asked to report how committed they are to research. Those who indicated that commitment to research is not at all characteristics of them published 0.28 during the five-year period. Faculty who reported that commitment to research is slightly characteristic of them published 1.3. The difference was higher in faculty that commitment to research is somewhat characteristic and highly characteristic. They have an average publication of 3.1 and 7.4, respectively. On another note, the majority of AAU faculty (86.7%) view themselves as successful. Only 13.3% believe they are not successful in their career. If they have to start their career all over again 77.1% would like to be faculty members and the remaining 22.9% would not. Now the analysis looks at the social knowledge variable set.

Analysis by Social Knowledge Variables

Social knowledge variables looked at faculty perception of their environment. It is stated by Blackburn and Lawrence (1995, p. 99) that "Faculty form beliefs from experiences with colleagues, administrators, committee decisions, faculty meetings, instructional rules and norms, and professional association practices. These beliefs constitute their social knowledge." In this study, the social knowledge variable set was able to uniquely explain 13% of the proportion of variance in publication output. The result was statistically significant ($p < .01$).

Faculty have their perception of the support services available at AAU for their scholarship to help them conduct the kind of inquiry they desire. The institutional and departmental atmosphere can motivate faculty to engage in research activities. If colleagues are

committed to the teaching of their discipline more than doing research or adding to the knowledge base, faculty might conform to their environment. Colleagues give constructive criticism and they could be sources of encouragement to do more. At some point in their career faculty will give and receive a stimulating response to their ideas. Faculty have their own perception of the extent to which their colleagues know their specialty well enough to assist and critically review their scholarly work. They receive feedback about their work from administrators, colleagues, students, and alumni. The majority of AAU faculty (91.2%) reported that there is at least one colleague who can critique their scholarly work. The remaining 8.8% indicated that there is no one who knows their specialty very well to give them a critique of their scholarly activities. AAU faculty who participated in this study reported the level of credence they give to their chairs' and colleagues' comments regarding their scholarly work. More than half of faculty reported some to a great deal of credence to their administrator's feedback on scholarly activities. However, 32.4% reported that they have never received feedback and 10.3% give little or no credence at all. The majority of the respondents (68.8%) gave some level of credence to comments from colleagues. A small number of faculty (7.3%) gave little or no credence while 23% never received feedback from their colleagues.

More than 74% of AAU faculty reported that the support services to conduct the kind of inquiry they desire is not available. Only 25.8% indicated that the support services are available. Faculty members who reported the availability of support services published, on average, about ten while those who did not, published about eight during the five-year period. In addition to the intellectual climate and collegial support, financial support is essential to research. Faculty look for financial research support from the institution they work for and from external sources. They were asked to report whether they have received research support from any of the following

sources during the five years: institution or department; federal agencies; state or local government agencies; non-governmental agencies; private foundations; private industry; and other. The majority of the university faculty did not receive research support from the listed sources. The percentage of faculty who received research support reveals that only a small number of faculty acquired support from internal and external resources. The findings also indicate that faculty members who received funding from the seven sources have a higher publication rate (in some cases twice as much) than those who did not receive funding.

The senate legislation clearly stated that AAU faculty need to distribute their effort 80% to teaching and 20% to conduct research. However, faculty have their own perception of how the institution prefers they spend their time. Faculty reported that AAU prefers they spend 60.05% teaching, 8.60% researching, 21.42% of their time in scholarship activities, and the remaining 9.93% in service. The teaching load is full every semester and sometimes all year long. This leaves faculty with little time to engage in research.

Analysis by Behavior Variables

The research behavior variable set uniquely explained 3.5% of the variation in publication output for the five year period. Faculty allocate their time to the activities they are "most motivated-by interest, by self-knowledge concerning their competence and their chances of success, and by the social knowledge they trust with regard to what students, peers, and administrators value and reward" (Blackburn and Lawrence, 1995, p. 106). The theoretical framework linked behavior with outcomes. The behavior variables looked at the number of proposals submitted to a government or private agency, written research reports for an agency, institution, or other group, the total number of proposals written during the five year period, and current percentage of research effort.

During the five years, AAU faculty submitted a total of 465 (M = 1.8) grant proposals. As the total number of grant proposals submitted increases the publication output was higher. Faculty who submitted three or more grant proposals have an average output of five or more publications. Publication rate was also higher for faculty who submitted proposals to a government or private agency. AAU faculty who submitted proposals have an average publication of three. The output increased linearly for the number of proposals submitted. Those who submitted more than ten proposals were prominent publishers with an average output of 12.6 publications. AAU faculty who wrote research reports also published higher than those who did not. Faculty who never wrote research reports have an average publication of 2.6. Faculty who wrote ten or more times published 12. Current percentage of effort given to research also indicated that faculty members who spend 15% or more of their time on research activities have an average publication of five or more for the five year period. The average percentage of effort given by AAU faculty was 15.1%.

The research findings indicate that faculty members who gave more time to research and who submitted more number of proposals, grants, and research reports published higher than those who did less during the five year period. In the theoretical framework, the behavior variable set was the strongest predictor of faculty research output. In this study the proportion of variance in publication rate explained by behavior variables is the smallest of the regression model.

Analysis by Environmental Response Variables

The environmental response variable set explained 11.6% of the total variance in publication rate. It is the third strong predictor next to career and social knowledge variable sets. Environmental response variables used in this study include number of review of journal articles, serving on an editorial board of a journal, and hours of clerical and student assistance given to

faculty. Faculty who received clerical and student assistance did not publish higher than those who did not. The results do not indicate any difference of publication output between the two groups. However, faculty members who reviewed articles for a professional journal and faculty who served in an editorial board of a journal published higher. As the number of journal articles reviewed by faculty increased their number of publication for the five year period also linearly increased. Faculty who never reviewed an article for a professional journal published 1.3 of their work. On the other hand, those who reviewed ten or more articles have an average publication output of 14.1. Faculty who served in three or more times in an editorial board of a journal published between 6 and 11 publications for the five-year period.

Analysis by Scholarship Activities

Publications present a clear product of research productivity. However, publication output is embedded in other scholarship and research related activities. Two areas of scholarship activities that may be tied to research activities are conference attendance and conversations regarding research. In addition to reporting the number of their publications and their research related performance, AAU faculty members also reported how often they have done scholarly activities during the previous academic year (2008-2009). Even if scholarship activities may not result in published work, conference presentation and conversations regarding research are important parts of the research endeavor of faculty. The findings also demonstrated that as the number of times a faculty member attended a visiting lecturer's presentation on campus and also attended a campus seminar where a colleague was presenting her or his work increased, so does publication output. When the number of times faculty members who had informal conversations about research with colleagues at professional meetings and those who had a telephone conversations

with colleagues to discuss their scholarly activities increased there was an increase in the number of publications output.

Qualitative Question

Responses from faculty to the qualitative question shed light into their motivation, hindrances, and opportunities to conduct research. The majority of faculty wrote about what discouraged them not to conduct research and provided their suggested solutions to maximize their research productivity. Some faculty members indicated that teaching and research are intertwined and teaching without research is dead. They saw teaching and research as intertwined and complementary. AAU faculty have their own motivation to engage in research. Some mentioned that they joy of finding drives their effort. Others reported that adding to their discipline's knowledge base is one of the factors that motivated them to conduct research. However, the long peer review process, sometimes takes more than a year, and other related challenges discouraged the research practice at AAU.

Some faculty members indicated that they need training, guidance, and the mentorship of senior faculty to learn how to engage in research activities. They reported lack of exposure to research and lack of training as hindrances to their research productivity. Most faculty members suggested that the institution should take the initiative to create an institutional climate that encourages research endeavor. This could be achieved by establishing efficient mechanisms to acquire funding and by providing easy access to use secured funding with less bureaucratic red tape.

The major setbacks for research productivity are reported to be heavy teaching load and low salary. AAU faculty have year-round full load teaching responsibility. On top of that, they teach extension students (continuing education) during evenings and weekends to earn more

money. Some also have teaching and consulting side jobs in other institutions and organizations. This leaves them with little or no time to think about research and to be engaged in meaningful research related activities. Faculty associated their lack of time to research to the low salary paid by the university. Some of their undergraduate students make a lot more money than faculty members who earned a terminal degree and who served faithfully for more than thirty years. The monthly salary cap for a full professor with many years of experience is 7050 Ethiopian Birr which is equivalent to USD 425.38 and no one has ever reached the salary cap (AAU, 2010; FCSA, 2008). This includes all university faculty and administrators including the president. The rest earn less than that. Foreign nationals earn more salary. This is because of the financial assistance from non-governmental sources to encourage international scholars to teach and research at AAU. This has its own advantages and disadvantages. While it helps to attract scholars from around the world, Ethiopian nationals are paid way less than their fellow foreign national faculty members for doing the same job.

It is important to note that Addis Ababa University does not set the salary scale for its employees. The Ministry of Education (MOE) and Federal Civil Service Agency (FCSA) set the salary scale and AAU is informed to implement it within the institution. The Federal Civil Service Agency set the salary standard for government employees in Ethiopia. Government employees with the same qualifications are paid somewhat the same regardless of the type of institution they are working. If FCSA wants to modify the salary scale for AAU, it needs a major policy change that will affect all government employees. This makes the salary issue more complex and leave faculty with less money to take care of their basic need. It is also difficult to compare AAU faculty salary with their peers at other public universities because they are paid on equal level. The only difference in salary is when faculty in public university are compared to

faculty at private university. Most of the faculty members and leaders in the newly flourishing private higher education institutions in Ethiopia are former public university faculty members and administrators.

The low salary, the heavy teaching load within and outside AAU, family responsibility, and amount of time given (or not given) to research are highly intertwined. The majority of AAU faculty reported that they are being torn apart by what they want to achieve as scholars, and the struggle to earn enough to provide for their family. There is no immediate solution without the direct involvement of the federal government by changing the salary scale to university employees. The new Business Process Re-engineering undergoing at AAU has some hope of getting institutional autonomy to increase the faculty salary through money earned from the continuing education sector as well as from distance education. Unless faculty are compensated enough for their expertise they will be looking for extra work to make ends meet. Their allegiance to the university will be eroded.

Faculty members who secured grant money from internal and external sources compared the university financial transaction system with a nightmare. In previous internal institutional assessments faculty criticized the procurement and financial system. In this study also faculty reported the difficulty of purchasing what they need in a timely manner. Most reported that they were discouraged by it. Faculty members should be trusted. If they are given access to teach the best and the brightest of the society and they were trusted by the funding agency to secure funding, the university should give them easy access to finances and have an efficient way of handling the purchasing and financial transaction process. As it is has been discussed in relation to faculty salary scale set by the Federal Civil Service Agency, financial transactions are also administered by codes from the Ministry of Finance and Economic Development (MOFED). All

government agencies are governed by the recent proclamation of the Ethiopian Federal Government Procurement and Property Administration Proclamation 649/2009. Further investigation of the issue at AAU revealed that finance department officials follow what is prescribed by the proclamation. This makes both faculty and administrators dissatisfied with the overall financial transaction process.

As the first and highly influential public institution, the Ethiopian government pays special attention to what happens at AAU. Unless government officials have a favorable view of AAU and trust the university faculty, the tension will continue and it will inhibit research activities at the university. In a televised discussion (debate), Prime Minister Meles Zenawi, with AAU faculty indicated that he did not have a favorable view of the institution for a long time (Asgedom, 2007). At one point he thought about ceasing its operation. Academic freedom and institutional autonomy enjoyed by world class institutions are not experienced by AAU faculty. This is reflected in the two year contract faculty sign with the university. They do not have the tenure system or a status that will shield faculty from job loss like it is practiced around the world. A total of 42 university faculty were fired in the early 1990s for their involvement in political affairs. The university wrote them a letter stating that their contract will not be renewed. Therefore, a favorable view of the institution from the Ethiopian government that is expressed in academic freedom, true and working institutional autonomy, and a strong financial support (salary and resources) might reignite faculty commitment to research and development.

In summary, to maximize their research productivity, AAU faculty suggested that the university needs to provide them with good salary, reduced teaching load, time to research, resources (material and financial), training, rewards to those who publish, collaborations with

other institutions, remove bureaucracy from the financial system, provide student assistantship, academic freedom, infrastructure, and guidance.

Findings of the study at AAU give insight into faculty research productivity at African institutions. Research findings of this study were examined within its African context. It was discussed in the literature that Africa's contribution to research is minimal in comparison to the contribution of the developed world. However, African faculty research productivity should be measured with a regional framework in mind. Most journals included in the *Science Citation Index* (SCI) are published in western countries (Tefera, 2003a). As it is reported in earlier studies, such journals are not interested in publishing research findings from African scientists (Tefera, 2003). Search engines and research databases do not include publications in local institutional journals. This will further exclude the published work from being accessed by international scholars. Research published by journals in the developed world are those associated with donors from a university in developed countries. This also forces African researchers to look for donor driven research topics rather than pursuing the kind of research they prefer to conduct.

It is important for African higher education institutions and research facilities to build a regional database that will store research performance of African researchers. Similar studies in the African institutions will reveal their level of productivity and serve as a tool to build a model that will address institutional, regional, and global participation of African scientists in research output. It is also important to the world research community to give credit to African researchers who are still engaged in research while the environment and resources were not suitable to conduct the kind of inquiry they desire.

Conclusions

How productive are AAU faculty?

Publications: There are productive researchers at Addis Ababa University. AAU faculty submitted or published 1054 ($M = 4.1$, $SD = 5.99$) of their professional writings during September 2004 -August 2009. The maximum publication by an individual faculty was 40 for the five-year period. Men published more than women faculty. On the average, non-Ethiopian faculty members have a higher publication rate than Ethiopian faculty. Those who were trained in a sandwich program produced publications higher than who were trained locally or abroad. Those housed in the natural science published more than social scientists. Senior faculty members are higher publishers. The most productive publishers are professors followed by associate and assistant professors. Faculty who received grants, involved in reviewing journal articles, and served on an editorial board of a journal published more than those who did not. AAU faculty who allocated 15% or more of their time to research published higher than those who did less.

What are the Differential Effects of Each Predictor Variable Set?

The results of this study support the theoretical framework in understanding the variance in faculty research productivity (publication output). The predictor variable sets were able to explain 67.6% of the variance in AAU faculty five-year publication output. The career variable set was the strongest predictor of the regression model. It is followed by social knowledge and environmental response variable sets. Self-knowledge and sociodemographic variables also explained a statistically significant proportion of the variance in publication rate. Behavior variables uniquely explained the smallest amount of variation in publication. However, most of

the individual behavior variables uniquely explained 20% or more of the variation in publication output.

Salient Predictors

Of the total predictors seven variables were statistically significant ($p < .05$). These variables are: academic rank, publication record, perseverance, state funding, private foundation funding, current research effort, and hours of clerical assistance. There were also nine variables which explained 20 or more % of the variance in publication output. The variables are: highest degree, publication record, publishes, committed to research, proposal to government/private, research report, proposal five years, review of articles, and hours of student assistance.

Limitations

There are limitations to this study. First, the number of publications is a self report and there is no way of verifying the number of publications. Second, the study looked at the frequency count of publication and not the quality of the published works. Third, even if the response rate was phenomenal in an African context and the findings were relevant, there was no longitudinal data that was available to compare research findings to previous studies.

Implications for practice at AAU

The results of this study appear to support that if the following are implemented within AAU faculty research productivity may be maximized.

1. If AAU wants to achieve what it aspires to be it needs to establish a research climate (culture) for its faculty at all levels of the institution.
2. If AAU wants to increase faculty productivity it needs to establish a reward structure to honor productive faculty through honorariums, merit raise, titles, and promotions (academic rank and other). "Rewards, pay dividends. While intrinsic motivation must

be high, faculty do respond to what they see and believe the organization honors" (Blackburn & Lawrence, 1995, p. 176).

3. To increase productivity AAU needs to assist faculty to write good proposals. It needs to establish a support system to write proposals. This could be done by using experienced faculty to train less experienced faculty in grant proposal writing and acquiring funds for research.
4. In addition to providing technical support to produce acceptable grant proposals faculty need time off to conduct their research. Using graduate students to assist them in their research and other areas has two benefits. First, it frees faculty to engage in research. Second, it will give a chance to train graduate students as future researchers.
5. It takes time to conduct a research, write it up, submit, and finally get it published. AAU needs to have patience to see the research productivity of its faculty.
6. If AAU wants to achieve its expansion plan it needs to execute plans. There has been so many self-evaluations and expansion plans. However, it is cyclical and the problems continue to inhibit faculty research productivity.
7. To increase faculty research productivity AAU needs to have a central and visible faculty profile reporting system (database) where faculty activities (course load, research activities, service activities) are stored, easily retrieved, and disseminated to AAU faculty and a wider audience.
8. AAU needs to build networking and collaboration with local, regional, and international institutions.

9. To maximize faculty research productivity AAU needs to identify productive researchers who excelled within the same environment and build institutional model to maximize their research productivity.
10. Lack of job stability creates a challenge to establish a long term research agenda. One possible remedy may include tenure or long term contract that will give faculty the benefits of academic freedom and the motivation to earn rewards.

Recommendations for further research

There are three recommendations for further research at AAU. First, studying environmental conditions and social contingencies might shed more light into faculty research productivity. This study was conducted while AAU was in the midst of continuous transformation with new business process re-engineering (BPR). There are so many changes happening and this study was a snapshot in the midst of accelerated progress. It will be very helpful for AAU to have a centralized faculty role performance reporting system. It is also advisable to conduct a longitudinal data analysis and continuous assessment of faculty research productivity. Third, exploring why those who were trained in a sandwich program published more than who were trained locally or abroad could benefit the university to nurture such programs to train faculty.

APPENDIX

INFORMATION NOTICE

Project Title: Faculty research productivity at Addis Ababa University

Principal Investigator: Mehary T. Woldegiorgis

University of North Texas

You are being asked to participate in a survey research project conducted through the University of North Texas. The purpose of this research study is to explore and evaluate the research productivity of Addis Ababa University faculty and to identify salient factors predicting productivity. You are being asked to complete a survey that will take about thirty to forty-five minutes. Answering the questions in the survey involves no foreseeable risks. Participation is voluntary and you may stop at any time without penalty. By completing the survey you are giving consent to participate and confirming that you are a faculty member at Addis Ababa University.

The results will not be used to report on a particular faculty member. Results of the survey will be reported only on a group basis. All surveys will be conducted at your leisure with the desired measures of confidentiality at your discretion. Completed surveys will be kept in my office. If you have any questions regarding this study, please contact Dr. Marc Cutright, Associate Professor of Higher Education and Director of the Center for Higher Education. This research has been reviewed and approved by the University of North Texas Institutional Review Board (IRB) (940) 565-3940. Contact the UNT IRB with any questions regarding your rights as a research subject.

Sincerely,

Mehary T. Woldegiorgis

COVER LETTER TO PARTICIPANTS

DATE: May 14, 2009

TO: Addis Ababa University faculty

FROM: Mehary T. Woldegiorgis

RE: Faculty Research Productivity Study

Greetings AAU faculty members! I am interested in surveying AAU faculty members to gather information regarding their research productivity. Your participation in this study is expected to significantly contribute to the understanding of faculty research productivity at AAU. Enclosed you will find an information notice and a survey. If you agree to participate, please keep the information notice for your records. The survey should take approximately thirty to forty-five minutes to complete. Your survey responses will be kept confidential. Completed surveys will be coded and data will be stored in a lockable filing cabinet in my office.

There is no foreseeable risk to you. You have the option of terminating your participation at any point during the research project. Also included is an information notice document, which requires your signature should you choose to continue with the project, and is to be signed and returned to the researcher. Again, I would like to thank you for your willingness to participate in this project. At the conclusion of the study, you will be contacted via e-mail and given the opportunity to receive the results of this study. If you have questions regarding this research, please do not hesitate to contact me. You may keep this letter for your records.

Sincerely,

Mehary T. Woldegiorgis

REFERENCES

Addis Ababa University (1999). *Institutional assessment report of NUFU's support for research and capacity building at Addis Ababa University for the funding period of 1996-1999.* Addis Ababa, Ethiopia: Research and Publication Office.

Addis Ababa University (2001). *Synopsis and institutional assessment of research and graduate programme proposals submitted to ESTC-SIDA/SAREC for 2002-2004 funding period.* Addis Ababa, Ethiopia: Research and Publication Office.

Addis Ababa University, (July, 2006). *Review of research activities at AAU*. Addis Ababa, Ethiopia: Office of Associate Vice President for Research and Graduate Programs.

Addis Ababa University, (January, 2008). University-level strategic plan (2000-2004 E.C). (Final Revision). Addis Ababa, Ethiopia.

Addis Ababa University (August, 2008a). Addis Ababa University Institutional self-evaluation report by members of the six taskforces. Addis Ababa, Ethiopia.

Addis Ababa University, (2009). Addis Ababa University senate legislation. Addis Ababa, Ethiopia.

Addis Ababa University, (2009a). Academic staff profile. Addis Ababa, Ethiopia: Office of the Associate Vice President for Academic Affairs.

Addis Ababa University, (2010). Faculty salary. Addis Ababa, Ethiopia.

Addis Ababa University, (2010a). Research business process re-engineering draft. Addis Ababa, Ethiopia.

Allison, P.D., & Stewart, J.A. (1974). Productivity differences among scientists: Evidence for accumulative advantage. *American Sociological Review, 39* (4), 596-606.

Altbach, P. (2003). African higher education and the world. In P.G. Altbach & D.Teferra (Eds.),

African higher education: An international reference handbook (pp. 143-148). Bloomington, IN: Indiana University Press.

Amare, G. Education in Ethiopia. In A. B. Fafunwa, & J.U. Aisiku (Eds), *Education in Africa: A Comparative survey* (pp.62-97). London: George Allen & UNWIN.

Arreloa, R.A. (1995). *Developing a comprehensive faculty evaluation system.* Bolton, MA: Anker Publishing.

Asgedom, A. (2007). *Academic freedom and the development of higher education in Ethiopia: The case of Addis Ababa University 1950-2005* (Unpublished doctoral dissertation)**.** University of East Anglia, United Kingdom.

Astin, H.S. (1978). actors affecting women's scholarly productivity. In H.S. Astin & W.Z. Hirsch (Eds.), *The higher education women* (pp. 133-157). New York: Praeger.

Balsvik, R.R. (2005). *Haile Sellassie's students: The intellectual and social background to revolution, 1952-1974*. Addis Ababa, Ethiopia: Addis Ababa University Press.

Bean, J.P. (March, 1982). *A causal model of faculty research productivity*. Paper presented at the Annual meeting of the American Educational Research Association (New York, NY, March 19-23). (ERIC Document Reproduction Service No. ED216661)

Bekele, E. (1995). *Current status of research development problems and management in higher education in Ethiopia with particular reference to AAU*. Addis Ababa, Ethiopia: Addis Ababa University Research and Publication Office.

Bekele, E. (1995). *Publications related to research and teaching activities 1980-199*: *Volume I-science faculty*. Addis Ababa, Ethiopia: Addis Ababa University Research and Publication Office.

Bentley, R. J., and Blackburn, R. T. (November, 1990). *Relationship of faculty publication*

performance with age, career age, and rank. Paper presented at the annual meeting of the Association for the Study of Higher Education, Portland, OR.

Bieber, J.P., & Blackburn, R.T. (1993). Faculty research productivity 1972-1988: development and application of constant units of measure. *Research in Higher Education, 34* (5), 551-567.

Blackburn, R.T., Behymer, C.E., & Hall, D.E. (1978). Research note: Correlates of faculty publication. *Sociology of Education, 51* (April), 132-141.

Blackburn, R. T., Bieber, J.P., Lawrence, J.H., & Trautvetter, L. (1991). Faculty at work: Focus on research, scholarship and service. *Research in Higher Education*. 32, 385-413.

Blackburn, R.T., & Mackie, C.J. (1992). Test-retest coefficients and the national faculty surveys. *Review of Higher Education, 16*(1), 19-39.

Blackburn, R.T., & Bentley, R.J. (1993). Faculty research productivity: Some moderators of associated stressors. *Research in Higher Education, 34*(6), 725-745.

Blackburn, R. T. & Lawrence, J. H. (1995). *Faculty at work*. Baltimore, MD: Johns Hopkins University Press.

Boyer, E. L. (1990). *Scholarship reconsidered: Priorities of the professoriat*e. New York, NY: The Carnegie Foundation for the Advancement of Teaching.

Braxton, J.M. (1983). Departmental colleagues and individual faculty publication productivity. *Review of Higher Education, 6* (2), 115-128.

Chan, S.S., & Burton, J. (1995). Faculty vitality in the comprehensive university: Changing context and concerns. *Research in Higher Education, 36* (2), 219-233.

Cole, J.R., & Cole, S. (1973). *Social stratification in science*. Chicago: University of Chicago Press.

Creamer, E.G. (1998). *Assessing faculty publication productivity: Issues of equity*. ASHE-ERIC Higher Education Report Volume 26, No.2. Washington, D.C.: The George Washington University, Graduate School of Education and Human Department.

Creamer, E.G., & McGuire, S.P. (1998). Applying the cumulative advantage perspective to scholarly writers in higher education. *Review of Higher Education 22*(1), 73-82.

Creswell, John W. (1985).Conceptual explanations of research performance. In Martin J.Finkelstein, *ASHE reader on faculty and faculty issues in colleges and universities*, (2nd ed., pp. 240-248). Washington, D.C.: Association for the Study of Higher Education.

Cutright, M. (2004). Review of the book *scientific communication in African universities: external assistance and national needs*. Retrieved January 14, 2008, from http://edrev.asu.edu/reviews/rev323.htm

Dundar, H., & Lewis, D. R. (1998). Determinants of research productivity in higher education. *Research in Higher Education*, *39*(6), 607-631.

Fairweather, J. S. (1999). The highly productive faculty member: Confronting the mythologies of faculty work. In W. G. Tierney (Ed.), *Faculty productivity: Facts, fictions, and issues* (pp. 55-98). New York: Falmer Press.

Federal Negarit Gazeta. (2009). The Federal Government Procurement and Property Administration Proclamation No. 649/2009. Addis Ababa, Ethiopia.

Federal Civil Service Agency (2006). Salary scale of AAU faculty. Addis Ababa, Ethiopia.

Fox, M.F. (1983). Publication productivity among scientists: A critical review. *Social Studies of Science, 13*, 285-305.

Fox, M.F. (1985). Publication, performance, and reward in science and scholarship. In J.C. Smart (Ed.), *Higher education: Handbook of theory and practice*. Vol. 1. pp. 255-282. New

York: Agathon Press.

Gall, M.D., Gall, J.P., & Borg, W.R. (2003).*Educational research: An introduction* (7th ed.). Boston,MA: Pearson.

Habib, A., & Morrow, S. (2006). Research, research productivity and the state in South Africa. *Transormation*, *62*, 9-29.

Hekelman, F.P., Zyzanski, J., & Flocke, S.A. (1995). Successful and less successful research performance of junior faculty. *Research in Higher Education, 36* (2), 235-255.

Kennedy, D. (2003). *Academic duty*. (7th ed.). Cambridge, MS: Harvard University Press.

Kerr, C. (2001). *The uses of the university* (5th ed.). Cambridge, MS: Harvard University Press.

Lawrence, Janet H. & Blackburn, R. T. (1988). Age as a predictor of faculty productivity. *Journal of Higher Education*, *59*, 22-39.

Layzell, D.T. (1999). Higher education's changing environment: aculty productivity and the reward structure. In W. G. Tierney (Ed.), *Faculty productivity: Facts, fictions, and issues* (pp.3-37). New York: Falmer Press.

McGee, G.W., & Ford, R.C. (1987). Faculty research productivity and intention to change positions. *Review of Higher Education, 11*(1), 1-16.

Middaugh, M. F. (2001). *Understanding faculty productivity:Standards and benchmarks for colleges and universities.* San Francisco: Jossey-Bass.

O Meara, K., & Braskamp, L. (Winter 2005). Aligning faculty reward systems and development to promote faculty and student growth. *NASPA Journal*, *42*(2), 223-240.

Pedhazur, E.J. (1997). *Multiple regression in behavioral research: Explanation and prediction* (3rd ed.).Belmont, CA: Wadsworth Publishing Company.

Perry, R. P., Clifton, R., Menec, V., Struthers, C. W., & Menges, R. (2000). Faculty in

transition: Modelling the relationship of research productivity. *Research in Higher Education, 41*, 165-194.

Porter, S.T., & Umbach, P.D.(2001). Analyzing faculty workload data using multilevel modeling. *Research in Higher Education*, *42* (2), 171-196.

Sanyal, B.C., & Varghese, N.V. (2006). *Research capacity of the higher education sector in developing countries*. Presented at the second international colloquium on research and higher education policy (Paris, 29 November-1st December). UNESCO Headquarters.

Sax, L.J., Hagedorn, L.S., Arredondo, M., & Dicrisi III, F.A. (2002). Faculty research productivity: Exploring the role of gender and family-related factors. *Research in Higher Education, 43* (4), 423-446.

Shibeshi, A. (1995). Problems of staff recruitment and retention in higher education institutions of developing countries. In *Proceedings of the national workshop on strengthening educational research* (pp.149-162). Addis Ababa, Ethiopia: Institute of educational research, Addis Ababa University.

Teferra, D. (2003a). *Scientific communications in African universities: External assistance and national needs*. New York, NY: Routledgefalmer.

Teferra, D. (2003b). Scientific communications and research in African universities: Challenges and opportunities in the twenty-first century. In P.G. Altbach & D.Teferra (Eds.), *African higher education: An international reference handbook* (pp. 128-141). Bloomington, IN: Indiana University Press.

Teferra, D., & Altbach, P. (2003). Trends and perspectives in African higher education. In P.G. Altbach & D.Teferra (Eds.), *African higher education: An international reference handbook* (pp. 3-14). Bloomington, IN: Indiana University Press.

Tien, F. (2000). To what degree does the desire for promotion motivate faculty to perform research? Testing expectancy theory. *Research in Higher Education, 41* (6), 723-752.

Tien, F., & Blackburn, R.T. (1996). Higher education reform in Taiwan: History, development and the University Act. *American Asian Review*, *14*, 35-57.

UNESCO (United Nations Educational, Scientific and Cultural Organisation) (2005). *Towards knowledge societies*. Paris: UNESCO.

Wagaw, T. (1979). *Education in Ethiopia*. Ann Arbor, MC: The University of Michigan press.

Wagaw, T. (1990). *The development of higher education and social change: An Ethiopian experience*. Ann Arbor, MC: The University of Michigan press.

Wondimu, H.(2003). Ethiopia. In P.G. Altbach & D.Teferra (Eds.), *African higher education: An international reference handbook* (pp. 316-325). Bloomington, IN: Indiana University Press.

World Bank, (2000). *Higher education in developing countries: Peril and Promise.* Washington, D.C.

Zuckerman, H. (1967). Nobel laureates in science: Patterns of productivity, collaboration, and authorship. *American Sociological Review*, *32* (3), 391-403.