2015

Faculty Research Productivity in Saudi Arabian Public Universities: A Human Capital Investment Perspective

Abad Alzuman
Virginia Commonwealth University, alzumanan@vcu.edu

Faculty Research Productivity in Saudi Arabian Public Universities: A Human Capital Investment Perspective

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University.

by

Abad Alzuman
Bachelor of Education, Majmaah University, Saudi Arabia, 1999
Masters of Health Administration: King Saud University, Saudi Arabia, 2003

Director: Richard Huff, Ph.D.
Assistant Professor, Director of Graduate Studies
L. Douglas Wilder School of Government and Public Affairs

Virginia Commonwealth University
Richmond, Virginia
November, 2015

ACKNOWLEDGEMENT

First and foremost, I thank Allah for granting me the strength, knowledge, and determination to accomplish this work. My appreciation goes to my parents: my father, Nsser Alzuman, and my mother, Monirah Alzuman, for their incredible efforts, prayers, and persistent support during the years of my studies in the United States.

I would like to express, with sincere gratitude, my appreciation to my advisor, Dr. Richard Huff, for his support, kindness, and mentorship. Throughout the years of my PhD studies, he provided me with scholarly counsel and motivated me to be the best I can be. Also, I would like to extend my great gratitude to Dr. Farah Graham for her unlimited support and encouragement during my studies. The long hours she spent advising and assisting me while conducting this research contributed to my professional and academic growth through her support and friendship. Without the great efforts of Dr. Huff and Dr. Graham, this study would not have been accomplished. A special appreciation is dedicated to my late advisor, Dr. William C. Bosher, who is greatly missed, and whose support and encouragement had guided me when I started this research. He will always be remembered.

I would also like to thank the members of my dissertation committee, Dr. Magill and Dr. Stutts, for generously giving their time and expertise to better my work. Many thanks go to the faculty members, staff, and colleagues at L. Wilder School of Government and Public Affairs, who collectively made my Phd journey a memorable experience.

My greatest gratitude goes to my husband, Adel Aldawood, for his support and understanding. Without his support, I would not have been able to complete my studies. My love and thanks go to my children- Saad, Lama, and Noura, for sharing me this journey with patience and joy. I would also like to thank my beloved brothers and sister for their continuous support and encouragement all along.

TABLE OF CONTENTS

LIST OF TABLES

Table Page

Table Page

LIST OF FIGURES

Figure Page

Abstract

FACULTY RESEARCH PRODUCTIVITY IN SAUDI ARABIAN PUBLIC UNIVERSITIES: A HUMAN CAPITAL INVESTMENT PERSPECTIVE

By Abad Alzuman, Ph.D.

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Virginia Commonwealth University.

Virginia Commonwealth University, 2015

Director: Richard Huff, Ph.D.
Assistant Professor, Director of Graduate Studies
L. Douglas Wilder School of Government and Public Affairs

In an attempt to transition from its oil-based economy, the Kingdom of Saudi Arabia is taking further steps towards building a knowledge-based economy. Saudi universities play a pivotal role toward the country's attempts to achieve the desired sustainable economic growth. And because knowledge production is dependent on the human capital embedded in faculty members working at theses universities, the recommendations of the Saudi National Science and Technology Policy stressed the importance of enhancing research skills of faculty members and researchers at public universities using different means and initiatives. However, a little is known about the impact of the implemented initiatives to promote research on the actual research outcomes of faculty members working at these universities. This study examined the impact of research promoting practices, and faculty personal characteristics (i.e., age, gender, marital status, academic rank, citizenship, and origin of PhD degree) on the levels of faculty

research productivity at four Saudi Arabian public universities: King Saud University (KSU), King Abdulaziz University (KAU), King Khalid University (KKU), and King Faisal University (KFU). All PhD holder faculty members working at these universities were included in the sample of the study. A self-administrate web-based survey questionnaire was used to collect data for this study. Out of 7072 distributed questionnaires, 389 answered questionnaires were used for the data analysis.

Multiple regression results revealed that the following research-promoting practices have positive and significant relationships with faculty research productivity: supportive collegial environment, the high perception of the academic editing and translating services, the positive perception of the research funding process, the rate of participation in collaboration programs, and conference attendance. Faculty's perception of the role of research centers and research financial incentives revealed reverse relationships with certain types of faculty research productivity.

Among the personal characteristics of faculty members, full professors were found to have the highest levels of research productivity. Citizenship (tenure status), and origin of PhD degree were found to have positive relationships with certain types of faculty research productivity. Male faculty were found to have more publications in refereed journals compared to female faculty. Also, older faculty were found to have more publications in refereed journals compared to junior faculty.

CHAPTER I

INTRODUCTION

Because of their strategic role in building knowledge-based economies, universities worldwide face high pressure to improve their academic research capacity in the competitive market of higher education. For many countries, building research universities requires high funding to attract the best staff and students and to establish the infrastructure necessary for top research. Shin (2009) found that increasing investment in research and development by a country is highly related to the international publication output of its academics. Those academics and the intellectual capital they possess, and the culture they create, are the most valuable assets in a university. Therefore, it is necessary to invest in faculty members by using different means and resources to optimize their well-being, performances, knowledge, talent, and productivity (Webber, 2013). Finding out what means have more influence on faculty research productivity helps stakeholders in higher education develop alternative strategies to increase faculty research productivity and scientific innovation which can benefit the country's economic performance.

In Saudi Arabia, enhancing scientific research becomes a key component of the Saudi National Development Plans for achieving the social and economic aspirations of the country. The Ninth (2010-2014) and Tenth (2015-2019) Development Plans assert the importance of scientific research production to transition from the oil-based economy to a knowledge-based economy. According to the plans, this can be implemented through: (a) utilizing the results of

scientific research in addressing socioeconomic issues and transformation of knowledge into wealth; (b) encouraging the universities and companies to invest in research, development, and innovation fields along with ensuring enforcement of intellectual property rights laws; and (c) enhancing the research role of universities in line with the future needs of the society. Also, the plans emphasize the importance of optimizing the investment in human capital within higher education through: (a) continuing the scholarship program to the ranked international universities, (b) granting administrative and financial autonomy to state-owned universities and endorsing the new regulation of universities, and (c) developing programs to upgrade the capabilities of the faculty staff.

In 2002, the Saudi Arabian Council of Ministers mapped a national science and technology policy. Commensurate with this initiative, the Saudi Ministry of Higher Education (MOHE) started a project with the objective of assessing and identifying the actual needs of scientific research at public universities, in addition to estimating the quality and effectiveness of their research outcomes (Gallarotti & Al-Filali, 2012). The target of this project is to improve research performance at public universities. This project placed a special emphasis on developing a human capital pool at these universities by hiring high calibre faculty and researchers (Onsman, 2010; Smith & Abouammoh, 2013).

According to the report of the U.S.-Saudi Arabian Business Council (2009), public spending for education is estimated at 5.7% of the country's gross domestic product (GDP). The number of public universities increased from eight universities in 2000 to 25 universities in 2012, and the numbers of enrolled students and faculty showed similar increases as well during the same period (Qandile & Oganesyants, 2014). Huge portions of university resources were

invested in strengthening research infrastructure as well as to design and implement strategies that aim to promote faculty research productivity.

Van der Weijden, De Gilder, Groenewegen, & Klasen (2008) argued that organizational performance depends on both the capacities of workers and the environment in which they work. In other words, to enhance the organizational performance it is important to hire a well-trained employee as well as to use effective management practices. It is necessary for the leaders at Saudi public universities to understand the impact of research-promoting practices, which are carried out by the universities, on faculty research outcome. Finding which practices can predict high levels of faculty research productivity allows decision makers to efficiently assess the current policies related to improving scholarly productivity. In addition, it is important to understand the impact of workers' personal characteristics on their productivity level (Bloom & Van Reenen, 2010).

Statement of the Problem

One objective of the Saudi National Science and Technology Policy is to qualify the manpower in the field of science and technology and continue its quantitative and qualitative development. Commensurate with this objective is the development of faculty members' research skill for its importance to the sustainability of research outcomes and scientific innovation at Saudi public universities. To achieve this goal, universities implement several research-promoting practices to motivate faculty research productivity. However, there is little information available on how and why faculty respond to research expectations at Saudi public universities (Borg & Alshumaimeri, 2012). Moreover, there is a dearth of information about the impact of these practices on the actual research outcome of faculty members. To introduce effective procedures for assessing their research performance, universities need more knowledge

about how and why research productivity differs across faculty, and to know what are the most important factors influencing research activity.

Purpose of the Study

The purpose of this study is to examine which research-promoting practices in Saudi public universities have an impact on faculty research performance. In addition, this study investigated researchers' personal characteristics and their relationships with faculty research outcome. This is an exploratory study of importance for the stakeholders in Saudi Arabian higher education as it offers information on certain factors that can impact faculty research productivity. Understanding how research productivity differs among individual faculty helps decision makers in identifying and designing alternative strategies to enhance faculty research productivity.

This study seeks to add to the body of literature about faculty scholarly productivity by exploring the correlation between research-promoting practices, in addition to researchers' personal characteristics, and faculty research outcomes across a sample of Saudi Arabian public universities. This research is one of the first attempts to study faculty research productivity at Saudi Arabian universities from a human capital investment perspective. Therefore, the researcher believes that this study can provide insightful information to make rational decisions about the current policies promoting research in Saudi public universities.

Research Questions

The major research question of this study is whether the implementation of the current research promoting practices at Saudi public universities has provided a high level of faculty research productivity?

The secondary questions associated with the major research question are:

- What research-promoting practices are significantly related to the level of faculty research productivity at Saudi Arabian public universities?
- What personal characteristics are significantly related to the level of faculty research productivity at Saudi Arabian public universities?

Objectives of the Study

- To empirically investigate the factors associated with faculty research productivity in a sample of four public research universities in Saudi Arabia.
- To provide stakeholders in Saudi Arabian higher education with information and recommendations that can enhance faculty research outcomes.
- To explore and find the most influential factors associated with the level of faculty research productivity which can help in evaluating and redesigning the current institutional research policies in Saudi universities.

Policy Implication

The study aims to provide policymakers with information about the factors associated with faculty research productivity. This information is of particular importance to decision makers and academicians in Saudi higher education. For decision makers, knowing about the factors impacting faculty research productivity will help them to decide how to utilize their human, financial, and physical capital effectively to achieve their academic and scientific goals. Likewise, if faculty members become aware of these factors, they can better understand how to efficiently enhance their research skills and publication productivity in accordance with university leaders. This would result ultimately in increasing faculty research productivity which benefits the universities, and the economy.

Limitations

1. The study was limited to faculty members at four Saudi public universities listed as the highest research productive universities.

2. Scholarly research productivity was measured by counting faculty research outcome over 5 years (from 2008 to 2013).

Definitions

MOHE. Saudi Ministry of Higher Education

Faculty members are the academicians in three academic ranks: full professor, associate professor, assistant professor.

Public university refers to governmental universities that are supervised and funded by the Saudi Ministry of Higher Education.

Tenure. In the Saudi higher education system all faculty who are Saudi citizens are granted immediate tenured posts, while all non-Saudi faculty members are signed to non-tenured, renewable short-term posts.

Human capital. The skills, knowledge, and experience possessed by an individual and viewed in terms of their value or cost to an organization or a country. Human capital can be invested in through education and training and other means that can lead to an improvement in the quality and level of production (Schultz, 1961). In this study, investment in human capital refers to certain research-promoting practices that are implemented by a university to enhance and improve faculty research outcomes.

Research-promoting practices refers to a set of practices carried out by a university to prompt research. In this study these practices are supportive collegial environment and research

climate, research support services, participation in collaboration programs, conference attendance, teaching and administrative workloads.

Research support services refers to human, financial, and logistics resources provided by a university to support faculty and student research

Collaboration programs are collaborative agreements between Saudi public universities and (a) national and international institutes along with businesses to conduct research projects, and (b) international expert researchers to mentor faculty members and improve their research skills.

CHAPTER II

HIGHER EDUCATION IN SAUDI ARABIA

This chapter aims to provide a detailed description of the Saudi higher education system as well as to familiarize the reader with some of its unique features. After reading this chapter, the reader will be acquainted with the major issues at Saudi public universities which are related to academic research and academic profession.

Saudi Higher Education System

The postsecondary system of education in Saudi Arabia is, to a certain degree, similar to the educational system of the United States. But patterns and procedures in the Saudi educational system have been adopted in accordance with Islamic systems, traditions, and customs (MOHE, 2012). The Saudi MOHE is the centralized authority responsible for directing university education in accordance with the adopted national policy, supervising the development of university education in all sectors, encouraging research, and formulating rules and regulations for compliance by all universities (MOHE, 2015). To promote academic research, the Saudi MOHE supports establishing specialized research institutes and centers, and conducts scientific symposiums and conferences that enable universities' academic staffs to participate in specialized scientific activities and learn about updates in their fields (MOHE, 2015).

In recent reforms to promote a knowledge-based economy, Saudi Arabia increasingly expands its investment in education (Qureshi, 2014; Yusuf, 2014). Prior to 2000, the government concentrated on funding other areas, such as reinvestment in oil production an

defense, while the education sector received fewer subsidies (Khatib, 2011). The Saudi Arabian public universities increased from eight in 2000 to 25 in 2015, in addition to 30 private universities. Education and health services are provided free to almost a million enrolled students (MOHE, 2015). Generally, the Higher Education Council sets the regulations and bylaws to be implemented by all Saudi public universities; these include student admission procedures and personnel policies for faculty members (e.g., salaries, promotion, reappointment and retirement age) (Alkhazim 2003). However, the government is gradually adapting a deregulation policy to bring more autonomy to public universities over their operations to promote excellence and innovation (Al-Eisa & Smith, 2013).

The MOHE of Saudi Arabia has started to restructure its education system as a consequence of the domestic terror attacks in 2003. A wide array of programs were implemented to improve the higher education system. These include enhancing quality education, promoting more scientific research, increasing scholarships to international universities, and planning for more proper financing of universities. However, some issues are yet to be faced such as monitoring the quality of its growing higher education sector, and the general policy of gender segregation (Onsman, 2011).

Faculty Members in Saudi Universities

As is the case in other universities, a faculty member at a Saudi public university is expected to teach, carry out research, and contribute to community service activities. Promotion is linked to these three components regardless of university's mission (Al-Ghamdi & Tight, 2013). According to the Qassim University, *Faculty and Staff Handbook* (Al Yahya & Irfan, 2012), faculty members are professors, associate professors, and assistant professors. Promotions to higher academic positions shall meet the following conditions: years of service, minimum

number of scientific productions published or have been accepted for publication, teaching, and services provided to the university and society. Articles 32 and 33 in the *Faculty and Staff Handbook* states that:

> Published materials or materials approved to be published in arbitrated educational (scientific) journals (within the minimum requirement for the promotion of the member of the teaching staff) shall not be fewer than four research units regarding applicants for promotion to the position of associate professor and six research units for promotion to the position of professor. (Al Yahya & Irfan, 2012, p. 48)

There are two different types of academic jobs in Saudi public universities. The first is a tenured position with a high level of job security and a fixed regular annual increment which is assigned for Saudis. Usually, length of service and rank, not job performance appraisal, determine their pay. The second type is a nonpermanent position that is assigned to a non-Saudi faculty member who works on a renewable contract and enjoys negotiable salaries and fringe benefits contingent upon their area of specialization, credentials, and market demand (Al-Ohali & Al-Mehrej, 2012).

Mazawi (2005) argued that national and non-national faculty members in Saudi Arabian universities differ in status and employment conditions, as non-nationals represent a rigidly-defined legal and administrative category of academic workers who are not allowed to acquire tenure or Saudi Arabian citizenship, and therefore show a higher turnover rate. By contrast, Saudi nationals are often appointed directly into tenure-track positions following graduation from local or foreign universities.

Academic Research in Saudi Arabia

Enhancing research productivity in higher education is one of the objectives in the National Development Plans that aim at achieving social and economic aspirations for the country. Thus, the importance of academic research has vastly grown at the public universities fuelled by the increases in governmental funding for research (Alzahrani, 2011). Currently,

public universities account for approximately 75% of all scientific publications in Saudi Arabia. Table 1 shows the publication outcomes at Saudi public universities in 2013. Three of the top universities have shown rapid increases in the number of international publications over the last 5 years, as each has more than 400 international publications annually (Al-Ohali & Shin, 2013). Other public universities showed either a modest number of publications or none at all.

Table 1

Research Outcome at Saudi Public Universities 2013

	Public university	No. published research	No. faculty members
1	King Saud University	2,594	7,353
2	King Khalid University	443	2,212
3	King Abdulaziz University	432	6,865
4	King Faisal University	332	1,432
5	Dammam University	310	1,990
6	Taif University	221	1,934
7	Taibah University	175	1,040
8	King Saud University for Health Specialists	130	406
9	Prince Noura University	86	1,511
10	Almajmaa University	70	676
11	Prince Salman University	65	1,521
12	Imama Mohammad bin Saud University	63	3,768
13	Aljouf University	58	962
14	Najran University	52	1,026
15	Umm Alqura University	51	3,799
16	Albaha University	42	1,042
17	Jezan University	40	2,187
18	Islamic University	32	644
19	Tabouk University	20	1,102
20	Shaqra University	11	931
21	Hail University	10	1,632
22	Northern Borders University	10	525
23	Qaseem University	0	3,152
24	King Fahd University of Petroleum & Minerals	NA	1,078
Total		5,247	48,788

Source. Saudi Ministry of Higher Education Report (2013).

Many studies were conducted to explore the structural and organizational obstacles to faculty research productivity in Saudi Arabian universities. In a study about the scientific

productivity of Saudi faculty members at Umm Alqura University, Alzahrani (1997) indicated that about 38.4% of faculty members have failed to produce any research since their graduation. Pay increases and promotions were ceased for faculty because they failed to produce the required amount of research for their promotion. The following obstacles were reported by several studies as major contributors to low scientific productivity at Saudi public universities: scarcity of conferences and scientific meetings, few chances to attend such conferences abroad, poor library facilities, insufficient research equipment and facilities, unavailability of research assistants and support staff, low encouragement and motivation to researchers, limited funds allocated to research, long administrative procedures for processing research approval for publishing, limited channels for publishing faculty members' works inside their university, overloaded teaching schedule due to the shortage of teaching staff, heavy engagement in administrative duties, and poor research atmosphere (Al-Bishri, 2013; Al-Gindan, Al-Sulaiman, Muhanna, & Abumadini, 2002; Alghanim & Alhamali, 2011; Alshayea, 2005; Alzahrani, 2011; Azad & Sayyed, 2007). These obstacles led to a decline in the scientific research production inside public universities according to Al-Muhanna (2001), who argued that a reason behind that was faculty engagement in nonacademic activities and consultation work outside the universities motivated by the financial gain. In medical colleges the case was similar. Alghanim and Alhamali (2011) found that only 39% of faculty members in medical schools had published in the 2 years prior to the study. Lack of time, unavailability of research assistance, nonavailability of funds for research, and heavy workload were reported to be hindering the research activities of faculty members.

Saudi public universities have invested in establishing modern technology infrastructures and its solutions to promote education and research productivity. However, some older Saudi scholars resisted using these modern technologies for academic purposes such as accessing

electronic journals as they were not convinced by such advanced methods of research and development (Al-Asmari, 2005; Al-Kahtani, Ryan, & Jefferson, 2006; Ali, 2006). Alzahrani (2011) argued that in order to enhance faculty research performance, public universities have to provide automation for all research publishing activities, a periodic update to databases, free research services to researchers, and encourage faculty members to publish their work in internationally reputable journals.

To expand the quality and the quantity of research output, Saudi universities have been collaborating with national and international universities on joint research projects which led to a significant increase in joint authorship of academic papers by Saudi and international authors particularly in scientific fields. Al-Ohali and Shin (2013) indicated that over half of the international publication output of Saudi universities is in the form of joint publications with international authors. However, the case is different for many PhD graduates as some of them may not have a similar opportunity to continue their research work if they are not employed by a research institute. Jawhar (2012), a professor at King Abdulaziz University, indicated that when a PhD holder finishes his/her degree he/she has little mobility in research and less access to libraries to continue his/her work if not employed. Jawhar called for opening research centers for visiting postgraduates and independent researchers to promote a culture of research productivity in Saudi Arabia.

Gender differences in research performance among faculty members in Saudi public universities were reported as an issue by many studies. Due to the institutional structure of public Saudi universities, Saudi female faculty research productivity is low compared to their male counterparts. Leadership and decision making in Saudi higher education institutes are male-dominant which results in a marginalized presence of women in both the academic decision

making process and academic research activities (Al-Medlej, 1997). El-Sanabary (1994) argued that with male dominance in academic leadership positions, and with female academics limited access to senior positions, women cannot control the production of knowledge, and are more involved in teaching and clerical administrative duties. According to El-Sanabary, Saudi women faculty were positioned outside the circle of influence and were not provided with as much access to resources as their male colleagues.

Mazawi (2005) indicated that, in Saudi public universities, female faculty members have limited access to senior positions, do not control the production of knowledge, and are more involved in teaching than in research. As male dominance is consolidated by the employment of more male expatriates, women represent in this context a "double-minority" compared with citizens and non-nationals at public universities. Varshney and Damanhouri (2012) argued that female faculty in Saudi universities expressed their dissatisfaction with the current level of research support they receive from the universities. They reported lack of department heads' support, excessive workload, absence of mentorship and guidance by the higher senior level, and poor skills in conducting data collection and analysis to be the major obstacles to their research productivity.

Summary

This chapter has presented a review of the studies and arguments in the literature regarding the Saudi higher education system and how it functions. First, the chapter gives a glimpse of how the system works and what vision it embraces and where it stands. Also, the significant role of the academic profession in Saudi public universities was discussed with a focus on the major challenges surrounding this profession. Then, a handful of cited studies were reviewed on the academic research in Saudi public universities and the major obstacles facing

research activities among their faculty. The majority of these studies reported enormous institutional and state level obstacles hindering research productivity in these universities, which challenges the actual institutions' efforts to enhance and improve faculty research performance.

The next chapter focuses on the literature on research productivity issues in general, in addition to the major institutional and individual factors found to be significant correlates to faculty research productivity. It also discusses the theoretical framework used in this study to explain and support the research problem under study. The chapter ends by suggesting the study framework.

CHAPTER III

LITERATURE REVIEW

This chapter is divided into two parts; the first part explores the theoretical framework of the study. The second part reviews the relevant previous studies on the potential contributors to faculty research productivity. Study hypotheses are included in the following discussion supported by the body of literature about the correlates to faculty research productivity.

Theoretical Framework

Few studies have succeeded in employing a theoretical base to guide them in investigating research productivity. Tien and Blackburn (1996) argued that it is difficult to "anchor" a study about research productivity in a theoretical framework. According to them, in previous studies researchers justified the selection of certain correlates and explained the relationships among them and productivity. In this study, I selected certain correlates based on their relevance to the most known practices that promote research at universities, in addition to a set of personal characteristics. Then I explored their relationships with faculty research productivity. The implementation of these practices aims at increasing faculty research productivity, which in part represents an aspect of the investment in the pool of human capital at a university to improve research outcomes. I used the theory of investment in human capital to discuss these practices and whether they are related to faculty research productivity at a Saudi public university. Finding out which practices can predict faculty research productivity can help the leaders in Saudi public universities make more effective decisions regarding the

improvement of faculty research performance with a consideration to investment in human capital. The following is a review of literature on the theory of investment in human capital and the relevant discussions about the organizational investment in human capital.

Investment in Human Capital

Schultz (1961) was one of the first pioneers who introduced the concept of investment in human capital. He defined it as the knowledge and skills obtained by the labour force through investment initiatives that are sponsored either by states, firms and institutions, or individuals. Baron and Armstrong (2007) defined human capital in an organization as the intangible resources that workers provide for their employers. Scarborough and Elias (2002) argued that the concept of human capital is most usefully viewed as a bridging concept that defined the link between human resource practices and business performance in term of assets rather than business processes. Huff (2006) suggested that the concept of human capital stems from the economic model of human resource capitalism which emphasizes the relationship between improved productivity or performance and the need for continuous and long-term investment in the development of human resources. Likewise, Crook, Todd, Combs, Woehr, and Ketchen (2011) argued that human capital theory, at both the micro and macro levels, predicts that investments in superior human capital generate a better firm-level performance. However, they indicated that human capital takes time and money to develop or acquire which potentially offsets its positive benefits.

Early studies asserted the importance of public spending on education and training, health, migration, and other public activities as the major patterns of investment in human capital to improve productivity and performance (Becker, 1964; Schultz, 1961). However, several recent studies used the concept to explain the importance of the organizational investment in the human

capital inside the organization using, in addition to financial resources, any type of assets and organizational processes and practices (Ferreira & Martinez, 2011; Jahangirfard & Amiri, 2013; Marimuthu, Arokiasamy, & Ismail, 2009; Powers, 2003).

Aleissa (1989) described investment in human capital as the employment of resources (private and social) for the development of human capital from which an improvement in individual productivity occurs. For individuals, workers will usually invest their human capital with an expectation of return on this investment from the employers in form of compensation and rewards, etc. (Becker, 1993). For the employer, the returns on investment in human capital are expected to be improvements in performance, productivity, flexibility, and a high capacity to innovate which should result from the increasing levels of knowledge and competence of the workers (Baron & Armstrong, 2007)

Using human capital theory to explain the variations in productivity across institutions is not new to the literature. Several studies have examined the impact of investments in human capital on firms' productivity. Riley (2012) indicated that from the perspective of human capital theory, firms make investments in employees in forms of training and other human resource management practices because they expect an improvement in the productivity and efficiency of the employees, and because they continue to generate returns on investment in future time periods. Also, Nafukho, Hairston, and Brooks (2004) argued that the main outcome from investing in people is the change manifested: (a) at the individual level in form of improved performance, (b) at the organizational level in the form of improved productivity and profitability, and (c) at societal level in the form of returns that benefit the entire society.

Snell and Dean (1992) argued that using human capital investment theory to explain the impact of human resources management practices, as a form of investment in the employees, can

be justified for many reasons. First, employees' skills and knowledge represent human capital because they enhance the organization's productivity. Second, human capital is the result of a firm's making a deliberate investment through applying certain human resources practices. Wright, McMahan, and McWilliams (1994) indicated that human resources in an organization form a pool of human capital available as a product of the employment relationship which creates a sustained competitive advantage for the organization to enjoy over its competitors.

Human capital theory does not illustrate the process of acquisition or transfer of human capital. To explain the transformation of the individual's skills and knowledge into organizational desired outputs, Storberg-Walker (2004) used the system modeling to describe how human capital in an organization (input) is transformed by the organizational human capital investment initiatives (process) into a higher productivity and better performance in the organization (output). Figure 1 depicts how the organizational intervention (investment process through which human capital in an organization is transformed) leads to its human capital transformation.

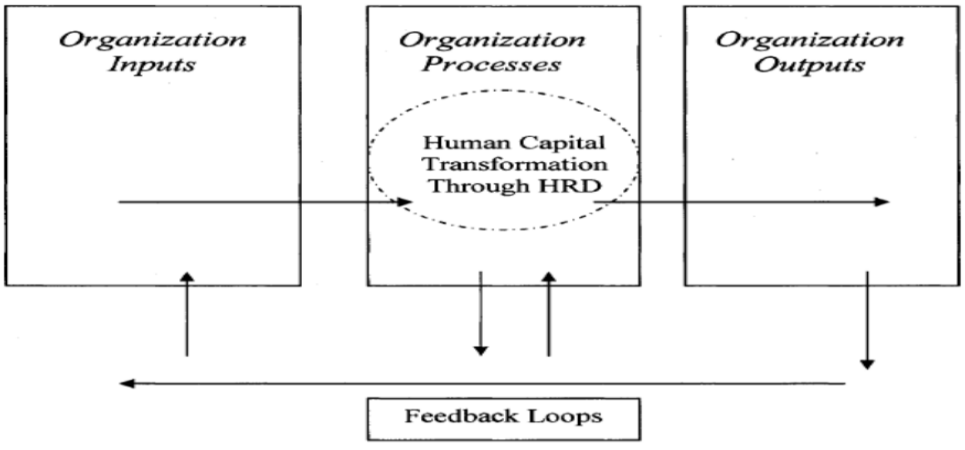


Figure 1. Human capital transformation as a process contributing to sustained performance. Adapted from "Towards a Theory of Human Capital Transformation Through Human Resource Development," by J. Storberg-Walker, 2004, *ProQuest Dissertations & Theses Global* database (UMI No. 305157822).

When managing their human capital assets, higher performing organizations tend to apply best practice methods as a form of investment to improve performance. These practices can be implemented in an organization by developing particular internal resources, capabilities, organizational processes, organizational attributes, information and knowledge, etc. (Zheng, Yang, & McLean, 2010). Moreover, organizations should recruit and retain the best employees, in addition to leveraging their skills and capabilities by encouraging individual and organisational learning and creating a supportive environment where knowledge can be created, shared, and applied (Crook et al., 2011; Stiles & Kulvisaechana, 2003).

The case is similar at higher education institutes where faculty members are considered the university's human capital (Rodgers & Neri, 2007; Webber, 2011). Hanley, Liu, and Vaona (2011) indicated that human capital is more commonly used to describe human resource capabilities in university research centres. Investment in human capital at a university can be carried out either in a form of professional development programs, or implementing an array of institutional practices that aim at improving the overall academic environment inside the university (Karukstis, 2015). However, faculty members are seen as differing from workers in most other organisations in ways that may make the investment in management tools less effective. One difference is that academics are thought to have a high degree of intrinsic motivation in relation to their work (McCormack, Propper, & Smith, 2013).

Investment in human capital by creating a strong research infrastructure is crucial to promoting the quality of education and research performance over the long term (Cantwell & Mathies, 2012). And because research productivity in academic departments is dependent on the human capital of the faculty members, in addition to the department specific conditions under which they work (Rodgers & Neri, 2007), universities need to consider recruiting and retaining

high calibre academic staff in addition to developing a research culture to create sustained and superior research performance. This was suggested by Fox and Milbourne (2006), who investigated the research output of academic economists at Australian universities to explore whether it is affected by the individuals' human capital and other institutional factors. They concluded that an increase in the overall level of the human capital at these Australian economics departments raised the research productivity of their faculty members.

Generally, it is difficult to establish correlations between organizational practices and the results of such practices or to determine causation (what actions or factors specifically created the change in performance) (Baron & Armstrong, 2007). Moreover, there are large numbers of confounding variables relating similar practices to research productivity. Therefore, and due to these respects, this study explored the relationship between faculty research productivity and selected research-promoting practices, based on what was suggested in the previous literature about the influence of certain management practices on individuals' research performance.

Defining and Measuring Research Productivity

Research is a common indicator of academic performance. Abramo, D'Angelo, and Di Costa (2011) defined scientific research as:

> the production process in which the inputs consist of human, tangible [scientific instruments, materials, etc.] and intangible [accumulated knowledge, social networks, etc.] resources, and where output [the new knowledge] has a complex character of both tangible nature [publications, patents, conference presentations, databases, etc.] and intangible nature [tacit knowledge, consulting activity, etc.]. (p. 916)

Several studies argued that research productivity is the extent to which a faculty engages in research activities such as publications in refereed journals, conference proceedings, writing a book or a chapter, gathering and analyzing original evidence, working with postgraduate students on dissertations and class projects, obtaining research grants, carrying out editorial duties,

obtaining patents and licenses, writing monographs, developing experimental designs, producing works of an artistic or a creative nature, and engaging in public debates and commentaries (Creswell,1985; Iqbal & Mahmood, 2011; Okiki, 2013).

A considerable works of the existing literature on research productivity have been largely quantitative, focusing on institutional, behavioral, and nonbehavioral contributors to research productivity using published records to measure faculty research performance (Bland, Center, Finstad, Risbey, & Staples, 2005; Fox, 1983; Hesli & Lee, 2011; Ito & Brotheridge, 2007; Jung, 2012). Combining various quantifiable measures of research productivity such as publications, grants, and conference presentations into one single measure has been another way to measure research productivity (Kim, Wolf-Wendel, & Twombly, 2011; Ramsden, 1994; Zainab, 2000). Other studies asserted the importance of measuring the quality in addition to the quantity of research productivity suggesting the usage of the following measurements: peer recognition, citation indices/score, curriculum vitae, weighted indices/summaries, grant awards, and having fewer coauthors with higher authorship positions in publications (Rebne, 1988; Townsend & Rosser, 2007). Labuschagne (1988) argued that citation analysis is considered the most objective and generally accepted method to measure research outcome. However, Hayes (1983) found that although “citation counting" has the virtue of being objective, quantitative, and replicable, it has the deficiency of failing to account for differences in quality and creativity.

However, counting research outcomes remains the most used method to measure research productivity in several studies. Ramsden (1994) indicated that publication quantifying is the most critical indicator of measuring research productivity as it is (a) central to scholarly activity and recognition, (b) has been widely regarded as the main source of esteem, (c) a requirement for individual promotion, (d) an evidence of institutional excellence, and (e) necessary for obtaining

competitive research funds. Moreover, quantifying research outcomes provides a complete representation of a faculty member's contribution to his or her institution and discipline (Strathman, 2000; Tien & Blackburn, 1996). Disagreeing with this approach, Alli (2002) argued that overemphasising the quantifying research productivity could lead to falsely maximizing the number of faculty publications by certain techniques such as the increase in coauthorships and the decrease in article length.

In this study, faculty research productivity was the dependent variable and was operationalized by counting faculty research outcomes of seven different types of research activities: overall research productivity, publications in refereed journals, publication in professional journals, published books, book chapters, edited and translated books, and papers presented at conferences.

Investment in Human Capital: Research-Promoting Practices

Management scholars have long advocated that human resources (HR) should be viewed from an investment perspective (Greer, 2001). Alexopoulos and Monks (2004) argued that current HR practices in many organizations are a type of investment, and that employees' ability and motivation to share and utilize their human capital to benefit the organization can be viewed as an outcome of these investments. Wright and Nishii (2007) proposed that the effects of HR practices on employees' attitudes and behaviours occur via employee perceptions of HR practices. They suggest that it is not the HR practices as intended by policymakers, but rather how employees experience the HR practices that will affect employee outcomes.

Management practices appear to be relatively heterogeneous within universities (McCormack et al., 2013); however, several studies chose to investigate the impact of certain bundles of practices on the employees' performance. Goodall, McDowell, and Singell (2014)

argued that management practices, such as using rewards and incentives in addition to effective communication, were found to be associated with the performance of researchers in the universities. Also, Middlehurst (2004) investigated the evolution of leadership roles and management structures in universities in the United Kingdom and found that implementing certain management practices by specialized units helped to support research and innovation at these universities. Bloom and Reenen (2010) suggested that management practices that reward efforts and performance are associated with a better firm performance.

In this study I argue that investment in academic human capital using certain research-promoting practices are related to faculty research performance at Saudi public universities. Enhancing research climate and attracting faculty to engage in research activities in a positive collegial environment at a university is a practice that can stimulate higher research productivity. Allowing more time for faculty to conduct research by decreasing teaching hours, in addition to allowing for periodic participation in collaboration programs and conferences attendance, are all expected to promote faculty research activity as well. Increasing the spending in establishing strong research infrastructures in addition to increasing research funds and researchers' pay are also important practices to improve faculty research performance (Dundar & Lewis, 1998).

Youndt and Snell (2001) studied the differential effects of HR practices on human capital, social capital, and organizational capital. They found that staffing, competitive pay, training, and promotion policies were important variables for distinguishing high levels of human capital in organizations. Creating a culture that provides research support to faculty in a university was found also to be crucial form of investment in human capital at a university. Research culture can be created by the recognition of research excellence, establishing research

centers, recognizing faculty research accomplishments, etc. (Hanover Research, 2014; McGill & Settle, 2013).

Faculty's perception of the importance of these forms of investment and their efficiency might influence the level of their research outcome. Previous researchers have focused mainly on academics' perception of the adequacy of institutional support provided to them by the university to improve research (Zainab, 2000). Understanding how faculty members feel about these practices and how they correlate to their research outcomes can help officials and administrators in both government and universities in making decisions about maximizing the economic investments they make in research and development.

Drawing upon previous literature, several research-promoting practices, which were empirically found as correlates to faculty research productivity, were used for this study to explore faculty research productivity: (a) supporting a collegial environment and research climate, (b) research support services, (c) participation in collaboration programs, (d) conference attendance, and (e) teaching and administrative workloads. The following is a review of the literature and the discussions pertaining to these practices followed by the study hypotheses that were tested.

Supportive Collegial Environment and Research Climate

This refers to the supportive environment and services provided by a university to promote excellent academic culture. Several institutional-level studies have related scholarly output to research support provided by a university to enhance faculty members' ability to engage in scholarship activities (McGill & Settle, 2012; Nguyen & Klopper, 2014; Wood, 1990). Faculty value for research is dependent on the institutional support they receive; and in return, a faculty value for research predicts his/her research productivity level (Hardré, Beasley, Miller, &

Pace, 2011). Smeby and Try (2005) suggested that collegiality is important in the scientific community as collegial dialogue and exchange may be an impetus to research activity and involvement. Finkelstein (1982) stressed also the importance of collegial interaction and defined it as "a reciprocal fulfillment of needs or exchange of services that occur in the course of faculty interactions" (para. 1). He also investigated the impact of collegial exchange on research productivity and found that the structure of collegial need fulfillment is importantly associated with research productivity. Similarly, Bland and Schmitz (1986) stressed the importance of socialization and networking with a successful researcher to the advancement of a faculty member. Harris and Kaine (1994) also argued that highly productive researchers who interacted with academics outside their own departments were active in several research-related areas. Elrick, Jenkinson, and Thomas (1996) found that the overall perception of the faculty member of the collegiality exchange, and other research supporting factors in the university are highly associated with research productivity among faculty members. Also, Heinze, Shapiro, Rogers, and Senker (2009) suggested that the freedom to define and pursue individual scientific interests within or beyond a broadly defined thematic area is central to understanding why scientists and their groups are highly creative.

In a comprehensive literature review, Creswell (1985) identified several individual and institutional predictors to faculty research productivity. He indicated that universities with high research output usually implement well-designed strategies and faculty development programs to improve faculty professional competence. Among these strategies are creating collegial environment, providing financial incentives, establishing research centers, support publications, and increase the potential for academic promotion.

An institutional climate in academia refers to the supportive environment and services provided by the university to promote excellent academic culture. Several institutional-level studies have related scholarly output to research support provided by a university to enhance a faculty member's ability to engage in scholarship (McGill & Settle, 2012; Nguyen & Klopper, 2014; Wood, 1990). Bland and Ruffin (1992) named the following 12 environmental factors as important to improve research productivity in a university:

- clear goals that serve a coordinating function;
- research emphasis;
- distinctive culture;
- positive group climate;
- assertive and participated governance;
- decentralized organization;
- frequent communication;
- accessible resources;
- sufficient size;
- age and diversity of the research group;
- appropriate rewards;
- concentration on recruitment and selection, leadership with research expertise, and skill in both initiating appropriate organizational structure and using participatory management practices.

Hadjinicola and Soteriou (2006) suggested the following three factors as predictors to research production: (a) the presence of a research center in the university, (b) research funding from external sources, and (c) better library facilities. However, not all studies found research support

to be the only contributor to faculty research productivity. Harris and Kaine (1994) investigated determinants of research productivity among faculty members in Australian universities and found that research performance is driven by individual motivation rather than research support services. Also, discrimination in providing research support services based on the faculty type of employment relates to faculty research productivity. McGill and Settle (2012) conducted a study on the determinants of institutional resources and support for computer science faculty and found that untenured faculty received less staff support, less funding for summer salaries and workshops and training, and less funding for improvements to office space or facilities than their tenured colleagues.

Many studies have linked high research productivity among faculty at earlier stages of their careers to the promotion motivation. Creswell (1985) defined promotion as the system of faculty ranks that serves as a hierarchical structure for faculty members through which they proceed in their careers by an upgrade of status and salary if they excel in scholarly work. Ju (2010) defined academic promotion as the structure of the academic career and the ladder of tenure system. He also indicated that promotion potential is an incentive for the novice professor to increase his/her research activity. Chen, Gupta, and Hoshower (2006) identified two factors with influence on academic research: (a) investment factors, or extrinsic rewards (e.g., income increase, tenure, promotion); and consumption factors, or intrinsic rewards (e.g., contributing to the discipline, and achieving peer recognition). Therefore, faculty members who publish for promotion rewards tend to be motivated by external rather than internal rewards. Visiting scholar programs are an important initiative adopted and funded by many universities to enhance faculty scholarly performance. Balakrishnan (2013) argued that to improve research performance, the fastest way for a university is to hire a highly published academic (even as a once in a week

visiting professor) rather than taking more intensive methods of developing research capabilities in-house. Beatty and Chan (1984) found that visiting scholars from Chinese universities who spent at least 6 months working at American universities made a positive difference to academic teaching and research activities when they returned to their universities at Chania.

Several studies found using financial incentives to be a strong predictor to faculty research productivity Chen et al., 2006; Finkelstein, 1982; Levin & Stephan, 1991). Heinze et al. (2009) suggested that factors related to spatial arrangements, such as the allocation of offices, junior research space, hallways, coffee bars or laboratory facilities; and social arrangements, such as lunchtime patterns, may also be organized so as to encourage the opportunities for communication across departmental borders, between staff, regardless of faculty's status and discipline. These factors represent an investment in faculty's human capital that is expected to improve their productivity and performance.

The discrimination in providing research support services based on the faculty type of employment can negatively influence faculty productivity. McGill and Settle (2012) conducted a study on the determinants of institutional resources and support for computer science faculty and found that untenured faculty received less staff support, less funding for summer salaries and workshops and training, and less funding for improvements to office space of facilities than their tenured colleagues.

This study maintains that when a university creates a supportive collegial environment it invests in the faculty human capital, which can impact the level of faculty research productivity. This study hypothesizes that a faculty member's perception of the collegial environment at the university relates to his/her research outcome level. Four subvariables were used to measure the collegial environment and research support at the university. These were (a) collegial

atmosphere, (b) publication support, (c) promotion potential, and (d) role of research centers. Hypotheses to be tested follow each of the subvariables.

1. Collegial atmosphere encouraging the exchange of ideas among faculty members:

H1a: Respondents reporting a positive perception of their academic atmosphere will report a higher level of research productivity.

H1b: Respondents reporting a positive perception of the intellectual stimulation in daily contacts with colleagues will report a higher level of research productivity.

H1c: Respondents reporting a positive perception of research cooperation with opposite sex colleagues will report a higher level of research productivity.

H1d: Respondents reporting a positive perception of visiting scholar programs will report a higher level of research productivity.

H1e: Respondents reporting a positive perception of academic freedom will report a higher level of research productivity.

2. Publication support:

H2a: Respondents reporting a positive perception of the university support for publications in refereed journals will report a higher level of research productivity.

H2b: Respondents reporting a positive perception of the financial incentives for research will report a higher level of research productivity.

H2c: Respondents reporting a positive perception of university support to publications in English will report a higher level of research productivity.

H2d: Respondents reporting a positive perception of the research funding process will report a higher level of research productivity.

3. Promotion potential:

H3: Respondents reporting a positive perception of promotion potential will report a higher level of research productivity.

4. Research centers.

H4: Respondents reporting a positive perception of the role of research centers will report a higher level of research productivity.

Research Support Services

Providing research support services helps to develop sustained research productivity at universities (Kraemer & Perry, 1998). Although there might be others, eight services were selected to operationalize this variable: course release time, availability of research assistant, research funding, sabbatical leave, access to computers, access to academic libraries, access to labs, translation and editing services.

The research funding provided by a university was found to be a strong predictor to the increased research productivity of faculty members (Cantwell & Mathies, 2012; Wood, 1990). Creswell (1985) suggested that allowing for sabbaticals, providing easy access to laboratories and libraries, and providing technical support to faculty can increase faculty research outcome. Balakrishnan (2013) found that universities can support research services using means such as sponsoring membership in associations, offering research grants, and providing English editing services. In an investigation of the determinants of research productivity in higher education, Dundar and Lewis (1998) indicated that institutional expenditure on libraries and the financial incentives to faculty members are positively related to departmental research productivity.

Eder and Pierce (2011) investigated research outcomes in a mid-sized community medical school which initiated a research assistance unit in 2006 to provide administrative and

statistical support to junior faculty in order to improve their research performance. They found that the creation of a staff support unit resulted in an increase in research productivity by faculty, residents, and students. Similarly, Froman, Hall, Shah, Bernstein, and Galloway (2003) found that establishing an office to provide physical and personnel services in a school of nursing on a large health science campus resulted in an increase in the engagement in research work among faculty at the school.

This study maintains that when a university provides research support services to its faculty, it invests in their human capital which can impact the level of their research productivity. Drawing on the findings from previous research, this study hypothesizes that faculty's perceptions of the importance of eight support services are related to their research productivity level. The study hypotheses tested are as follows:

H5a: Respondents reporting a higher perception of the importance of course release time to conduct research will report a higher level of research productivity.

H5b: Respondents reporting a higher perception of the importance of research assistants to conduct research will report a higher level of research productivity.

H5c: Respondents reporting a higher perception of the importance of research funding to conduct research will report a higher level of research productivity.

H5d: Respondents reporting a higher perception of the importance of sabbatical leave to conduct research will report a higher level of research productivity.

H5e: Respondents reporting a higher perception of the importance of accessing an academic library to conduct research will report a higher level of research productivity.

H5f: Respondents reporting a higher perception of the importance of accessing computers to conduct research will report a higher level of research productivity.

H5g: Respondents reporting a higher perception of the importance of accessing labs to conduct research will report a higher level of research productivity.

H5h: Respondents reporting a higher perception of the importance of academic translation and editing service to conduct research will report a higher level of research productivity.

Collaboration Programs

Academic collaboration is acknowledged to be an important transmission mechanism through which sciences can be diffused across regions and countries (Alsultan & Alzahrani, 2012). Several studies suggested the importance of academic collaboration programs to the academic research and asserted its positive impact on faculty research performance. Lee and Bozeman (2005) indicated that academic collaboration was often found to be associated with higher research productivity (number of publications) and quality of published works (citations). They also found that faculty research productivity increased as their participation in collaboration programs increased, particularly when the collaboration is outside of one's institution. According to a study conducted by Rush and Wheeler (2011) about enhancing junior faculty research productivity through multi-institutional collaboration, junior faculty's research productivity was found to increase as his/her participation in collaboration programs increases. Ju (2010) investigated factors that may lead to higher research productivity at research and nonresearch institutions and found that faculty collaboration with either domestic or international colleagues is essential for research productivity at both types of institutions. Moreover, he found that faculty collaboration with international colleagues is a predictor of their research productivity. Islam (2000) suggested that the research industry in the Middle East and Saudi Arabia would benefit from collaborative production and co-publication ventures with Asian and

Western presses. Also, Meo, Hassan, and Usmani (2013) found that, among other factors, collaboration with rich international research institutes contributed to the growth in research productivity at Saudi universities.

This study hypothesizes that faculty participating in collaboration programs positively correlates to their research productivity. The study hypothesis tested was as follows:

H6: Respondents reporting a higher rate of participation in collaboration programs will report a higher level of research productivity.

Conference Attendance

Scientific conference attendance was found to be a strong correlate to faculty research productivity. Rare scientific conference attendance was found to prevent faculty members from networking and acknowledging the updates in their fields of speciality which results in low research productivity. Smeby and Try (2005) argued that faculty research visits abroad suggest higher human capital or greater access to international research networks. Also, Alshaya (2005) suggested that regular attendance to academic conferences improves faculty research experience and increases networking with the expert researchers and scientists in their fields. It also allows faculty members to present and discuss the preliminary results of their research work in order to have them peer reviewed by other researchers.

This study hypothesizes that attending conferences positively correlates with faculty research productivity:

H7: Respondents reporting a higher rate of conferences attendance will report a higher level of research productivity.

Teaching and Administrative Workload

Faculty workload refers usually to the teaching and nonteaching tasks faculty perform as part of their job. Milem, Berger, and Dey (2000) asserted the importance of allocating faculty time to perform their job with consideration to three measures: teaching, research, and advising. Teaching and administrative workloads were found to have influence on research productivity (Porter & Umbach, 2001). They were generally measured by the amount of time devoted to perform tasks for each (Wood, 1990; Jung, 2012).

Faculty members usually devote more time for research work because research and publishing tend to be more heavily rewarded than teaching and service. Higher levels of research output were found to be associated with lower time expenditures in teaching and service (Bellas & Toutkoushian, 1999; Blackburn & Bentley, 1993). High teaching load was frequently seen by academics as a major obstacle to conduct research (Iqbal & Mahmood, 2011; Ito & Brotheridge, 2007; Wood, 1990). In a study about the factors influencing faculty research productivity at Association to Advance Collegiate Schools of Business-accredited schools in the Gulf Cooperation Council countries, Azad and Sayyed (2007) found that faculty prefer allocating more time to research and other scholarly activities than the university administrators expect and permit. Also, Ito and Brotheridge (2007) pointed out that minimizing teaching and administrative workloads of faculty can be a determinant in increasing their research productivity.

This study hypothesizes that having less teaching and administrative workload positively correlates to faculty research productivity:

H8a: Respondents reporting fewer teaching hours will report a higher level of research productivity.

H8b: Respondents reporting less administrative work will report a higher level of research productivity.

Personal Characteristics

A large stream in the literature tries to explain differences in research performance by examining the personal characteristics of researchers (van der Weijden et al., 2008). Many studies focus on individual and demographic characteristics as strong correlates to faculty research productivity. These include gender, age, marital status, citizenship, and family-related variables (Bellas & Toutkoushian, 1999; Gutiérrez, 2011; Porter & Umbach, 2001; Webber, 2011; Wood, 1999). Jung (2012) suggested that in order to explain research productivity among academics, researchers should first look at individual-level variables such as demographic characteristics, which are essential to gain full understanding of the academic life of faculty members. Usually, the individual characteristics of faculty and departmental factors are highly interrelated since the reputation of a research unit is largely influenced by the research performance of its members (Smeby & Try, 2005). Drawing on the findings of previous literature, the following variables were selected to operationalize faculty personal characteristics in this study.

Gender. Numerous studies revealed that gender difference in research performance exists in academia, and that female scientists publish at lower rates than male scientists (Blackburn & Lawrence, 1995; Prpić, 2002). Usually this was due to the fact that in the last few decades men had been appointed to positions superior to those of women, outnumbered women in academia, spent significantly less time in teaching, and were more academically specialized than women (Bellas & Toutkoushian, 1999; Leahey, 2006). However, gender gap in research productivity has declined in the last decades (Sax, Hagedorn, Arredondo, & Dicrisi, 2001). Many studies found

that once gender differences in positions and resources were taken into account, net differences between men and women in research productivity were null or negligible. Therefore, most of the recent observed gender differences in research productivity can be attributed to gender differences in other personal characteristics (Gallivan & Benbunan-Fich, 2006; Xie & Shauman, 1998). Also when examined how gender might influence the early research productivity of a group of tenured faculty in science departments, Rothausen-Vange, Marler, and Wright (2005) found that even in less research-oriented departments men may choose to publish more compared to women because they have less child care responsibility compared to women.

This study hypothesizes that male respondents have higher levels of faculty research productivity than female respondents. The study hypothesis tested is as follows:

H9: Male respondents have a higher level of research productivity.

Age. Previous studies suggested a strong correlation between age and research production. Age was either measured as a continuous variable or as a term of experience. Depending on other variables, age was found to have both a negative and positive relationship with faculty research productivity. For example, Teodorescu (2000), in a cross-national analysis of the correlates of faculty publication productivity in a 10-country sample, found that age had a strong predictive power with respect to publication productivity in the United States but not in the other countries included in the study. Also, in their study on the factors influencing research productivity of agriculture faculty members in Iran, Hedjazi and Behravan (2011) found a positive relationship between faculty research productivity and their age. Other studies linked high faculty research productivity to seniority and longer research experience of the faculty (Abramo et al., 2011; Alzahrani, 1997; Bland, Center, Finstad, Risbey, & Staples, 2006; Jung, 2012; Ventura & Mombrú 2006).

On the other hand, Diamond (1986) suggested that productivity dropped with age, and that the quantity and quality of current research output appear to decline continuously with age. However, Levin and Stephan (1989) investigated the age effect on the research productivity among academic scientists and found that age is a fairly weak correlate of research performance. Other studies found age not to be associated with faculty research productivity at all (Bland et al., 2005; Ramsden, 1994).

This study hypothesized that senior respondents have higher levels of faculty research productivity. The hypothesis tested is as follows:

H10: Older respondents have a higher level of research productivity.

Marital status. For their potential roles to cause conflict between family and career responsibilities, many studies have investigated the relationship between family-related factors, such as marital status and parenthood, and faculty research productivity. In a study about the relationship between family responsibilities and employment status among college and university faculty, Perna (2001) found that women with children publish less than childless women, which might be a result of the difficulties facing female faculty in fulfilling both family and career responsibilities. Likewise, Stack (2004) suggested that the gender gap in research productivity is often due in part to gendered household responsibilities; and that time, energy, and money devoted to household duties can reduce the research productivity of scholars, especially women.

This study hypothesizes that married respondents have lower levels of research productivity. The hypothesis tested is as follows:

H11: Married respondents have a lower level of research productivity.

Academic rank. During their careers, faculty members pass through a hierarchical structure to a higher status and salary by promotion. Tien and Blackburn (1996) investigated the

correlation between the faculty rank system, research motivation, and faculty research productivity and found that among the three ranked groups (assistant professor, associate professor, and full professor) low productivity appears in the early years of promotion, then it gradually rises as the time of promotion to full professor approaches. Because research productivity is a major criterion for promotion, high research productivity among faculty of higher rank is understandable (Bland et al., 2005; Sax et al., 2002). However, Osadebe (2014) found that assistant professors and lecturers have more publications, within a time period of 5 years, than associate and full professors. This was attributed to the fact that assistant professors and lecturers publish more for promotion and tenure. Wood (1990) suggested that, in some cases, young academics try to publish too quickly before their senior counterparts to gain a proper command of their subject matter. Also, Webber (2013) argued that variables related to length of time in the professoriate were also found to be contributors to the level of faculty productivity such as age, rank, time since receiving one's last degree, and/or time at one's current university.

This study hypothesizes that a faculty with higher academic rank has a higher level of research productivity. The hypothesis tested is as follows:

H12: Respondents reporting a higher academic rank will report a higher level of research productivity

Citizenship (tenure status). Citizenship has been investigated as a potential factor that might predict the differences in faculty research productivity. In academia, international faculty members are expected to bring diversity experience and rich knowledge to the universities as well as making unique contributions to teaching, service, and research. Webber (2013) argued that countries attract the "best and brightest" scholars from all over the world to work at their universities. In a study on the work roles of foreign-born female faculty and productivity at

research universities in the United States, Mamiseishvili and Rosser (2010) indicated that foreign-born academics in American universities were significantly more engaged in research, which was evident in their published scholarly production compared to U.S.-born faculty colleagues. Also, Kim et al. (2011) investigated the relationship between satisfaction and productivity differences among international faculty and American faculty, and concluded that foreign-born faculty were more productive than their American-born counterparts. Similarly, Webber (2013) examined the differences in faculty members' research productivity at doctoral-granting institutions by (foreign/U.S.-born) status controlling for selected individual and institutional characteristics. He found that foreign-born faculty members spent more time on research and less time on undergraduate instruction compared to their U.S.-born peers, and this may contribute to their higher levels of production.

In American universities, it is common to have different types of academic employment; however, obtaining a tenured position is determined by merit not by citizenship. A professor who meets the initial standard in an American university is granted tenure, and after a certain time the university tolerates little or even no research production on his or her part (Cater, Lew, & Privato, 2009). This contractual form of employment aims to encourage research efforts during the probationary period; however, it is controversial because it surely reduces the effort of some faculty members once tenure is achieved. This was corroborated by Leung (2009) in his investigation into the effect of academic tenure and job security on research productivity. He found a noticeable drop in faculty's productivity immediately after tenure is obtained. The overall drop was about 20% fewer papers than the predicted value if tenure was not granted, and the pattern of productivity growth flattens from an increase in productivity each year to almost no growth in productivity. Leung (2009) suggested that if a university wants to maximize the

productivity of its professors, it might want to consider changing the institution of tenure. However, several studies found no relationship between tenure and faculty productivity (Hu & Gill, 2000; Teodorescu, 2000).

The case in Saudi public universities is unique as citizenship indicates the tenure status of the faculty. Saudi citizens are always appointed as tenured (transferable position within Saudi higher education system) while all other faculty members are appointed to temporary academic positions. These differences in academic appointments might influence the productivity level among faculty members, as the type of appointment was found to be a contributor to faculty research productivity (Ju, 2010; Porter & Umbach, 2001). Harney, Monks, Alexopoulos, Buckley, and Hogan (2014) suggested that, for knowledge workers such as research scientists, contract employment can deny them access to many of the employment conditions and opportunities that govern their long-term success as professors.

In a study of the barriers to organizational creativity with an emphasis on citizenship at Saudi public universities, Sadi (2006) found that conferring the greater security and freedom of tenured positions only to Saudi faculty members compared to non-Saudi faculty members, who are appointed on renewable contracts, can affect the academic creativity and productivity of Saudi faculty. Furthermore, Sadi (2006) investigated the differences in the scholarly work among faculty in Saudi public universities and found non-Saudi faculty members to be more productive in research work than their Saudis. This was also suggested by Altabach (2014), who argued that the incentives for non-Saudi professors to perform adequately are high because they want to have their contracts renewed. However, there is little incentive for them to build institutional loyalty or to perform at their top levels.

This study hypothesizes that a Saudi faculty member who is appointed in a tenured position has a lower level of research productivity. The hypothesis tested is as follows:

H13: Tenured faculty will report a lower level of research productivity.

Origin of PhD degree. Many studies suggest that research productivity at higher education institutions is dependent on its academic human capital. Faculty members with excellent research training and skills are expected to have better research performance. Faculty human capital can be measured by (a) looking at the quality of their academic degrees, (b) looking at the ranking of the graduate program or school from which they graduated, (c) the research training obtained during graduate school, and (d) their individual attributes such as whether or not the faculty members have a PhD (Alli, 2002; Fox & Milbourne, 2007; Long, Bowers, Barnett, & White, 1998; Porter & Umbach, 2001; Ynalvez & Shrum, 2011).

Alli (2002) suggested that universities are able to provide greater scholastic capital to students, thereby equipping the students with the skills needed to conduct research. Similarly, Rodgers and Neri (2007) investigated why some economics departments in Australian universities were more research productive than others, and why the research productivity of an economics department related to the quantity and quality of its faculty's academic training. They found that the most research productive individuals were those with PhDs from the top graduate schools worldwide. That is because graduates from the top graduate schools were most likely to have higher levels of innate ability and motivation to do research. However, in another longitudinal study examining the predictors of research productivity for professors over the first 6 years of their career, Williamson and Cable (2003) argued that academic credentials of faculty are not predictors of faculty research productivity, but rather, it was the hiring decisions which were found to be heavily influenced by being graduated from a reputable university.

This study hypothesizes that a faculty member who obtained a PhD degree from a Saudi university has a lower level of faculty research productivity. The hypothesis tested is as follows:

H14: Respondents holding a PhD degree from Saudi universities will report a lower level of research productivity.

Summary

This chapter provides an overview of previous literature on the correlates to faculty research productivity. The theory of human capital was discussed with emphasis on the organizational investment in human capital and its impact on workers' productivity. Based on the findings from previous literature, two blocks of variables were used to explore the variance in research productivity for this study. The first block consists of an array of research-promoting practices that were found to be correlated to faculty research productivity. These include supportive collegial environment and research climate, providing research support services, participation in collaboration programs, conferences attendance, and teaching and administrative workload. The second block consists of six personal characteristics of faculty members: gender, marital status, age, citizenship/ tenure, origin of PhD degree, and academic rank.

CHAPTER IV

RESEARCH DESIGN AND METHODOLGY

This chapter describes the research design, population and sample selection, data collection instruments, and data analysis procedures used for this study. To remind the reader, the purpose of this study was to explore which practices and personal characteristics are significantly correlated to faculty research productivity at Saudi Arabian public universities.

Research Design

This study is a nonexperimental exploratory cross-sectional survey that provides a "snapshot" of the outcomes and the characteristics of the study problem at a fixed point in time at specific organizations. According to Levin (2006), cross-sectional studies are carried out at one time point or over a short period. In this study post-test snapshot data are used to study certain variables at a certain period of time to explore possible relationships between dependent and independent variables.

The limited time of the research and the limited resources available to the researcher made it the best design to conduct the study. This study also used the survey method technique to collect data. This method made it possible to access widely dispersed populations of individuals to collect data (Nachmias & Nachmias, 2007).

Sampling and Sample Size

The unit of analysis was the research outcome for an individual faculty member holding a PhD degree and working at one of the four top highly productive public universities in Saudi

Arabia. These are doctoral-granting and comprehensive universities (teaching major discipline for male and female students). These universities are located at four different geographical areas in Saudi Arabia. The subjects of the study were all faculty members holding a PhD degree who worked at any of these four universities. Teaching assistants, lecturers, and instructors were excluded from the study because they differ considerably in training and work requirements. The total population of the study was 7,072 distributed in the four universities. The selected universities included in this study were King Saud University (KSU), King Abdulaziz University (KAU), King Khalid University (KKU), and King Faisal University (KFU).

The rationale behind selecting these four universities to be included in the study was that these research universities are prolific in conducting research compared to the other public universities. Li, Millwater, and Hudson (2008) indicated that research had been primarily performed by the top-ranked universities. In addition, older Saudi public universities tend to have higher status and budgets, better-qualified and more stable staff, and usually are the preferred employers of academics (Onsman, 2011). Table 2 depicts universities that participated in the study.

Table 2

Universities Participating in the Study

	Public university	Total no. of faculty members	Faculty holding PhD	Location
1	King Saud University (KSU)	4,952	2,483	Riyadh
2	King Khalid University (KKU)	2,329	1,426	Asir
3	King Faisal University (KFU)	1,387	862	Eastern province
4	King Abdulaziz University (KAU)	2,329	2,301	Makkah
Total		15,896	7,072	

This type of selection is a nonprobability purposive sampling method that does not involve random selection, which means that in this study we could not depend upon the rationale of probability theory. Therefore, the sample was not a representative of the whole population of

faculty members in Saudi Arabian public universities, nor could the study results be fully generalized to them. Nonetheless, this method is most effective when one needs to study a certain cultural domain having knowledgeable experts within. It focuses on particular characteristics of a population that are of interest (Nachmias & Nachmias, 2007). The inherent bias of the method contributes to its efficiency, and the method stays robust even when tested against random probability sampling (Tongco, 2007).

However, this method has its short falls. First, it was difficult to obtain all population lists as it was very time consuming and challenging. Second, nonresponse bias might occur when members of the population refused or missed the opportunity to answer the survey questions; so the failure to collect the answers from this group could be a potential source of bias (Fowler, 2009).

Survey Instrument

A self-administrated Web-based survey questionnaire was used to collect data for this study. It was a bilingual (Arabic/English) questionnaire and had an e-cover letter explaining the purpose and significance of the study with an implied consent form in order to encourage participation and obtain a high response rate and honest responses (see Appendix B). The researcher assured subjects' confidentiality by keeping their information and answers saved and only accessible by the researcher who used these data for the purpose of answering the research questions. Data will be deleted within 3 months of the study's completion date.

An online survey tool is recognized for being cheap, self-administered, with a very low probability of data errors compared to a mailed survey that requires more time and money to implement (Groves et al., 2009). Using an online survey facilitates the quick, cheap, and nonlabor intensive data collection for the study. The online survey was an efficient technique to

collect data for this study because the entire target population could be reached via their professional emails.

However, using an online survey can impact the reliability of survey data as the respondents may not feel encouraged to provide accurate and honest answers when they feel uncomfortable providing answers that present themselves in an unfavourable manner. The lack of memory on the subject, or even boredom also may influence their ability to give a correct answer.

The questions asked were clear, nonoffensive and easy to answer. Babbie (1990) asserted the importance of (a) paying attention to the wording of the questions and the instructions in the questionnaire; (b) focusing on the clarity of the instructions, questions, and sentences; (c) avoiding negative and biased items; and (d) asking questions that participants are competent to answer.

Content Validity

Once drafted, the Arabic version of the questionnaire was tested for content validity. A panel of four faculty members, who speak Arabic and English, and who work for two Saudi academic institutions, Public Administration and King Saud University, were asked to evaluate the content of the Arabic version of the questionnaire. Based on their input, the researcher made the necessary changes and corrections in the questionnaire.

Data Collection Procedures

Deans of the scientific research departments at the four selected universities were contacted and informed about the study, and the lists of faculty members' e-mail addresses at these universities were obtained. The Web-based survey was distributed via e-mail to a total of

7,072 faculty members working in these four universities and data were collected between May 17 and September 13, 2014.

The questionnaire has three sections. The first section asked about faculty's perception of the supportive collegial environment and research climate and research support services using 5-point Likert scales, and research support services using 4-point Likert scales. The second section asked participants to report demographic and individual information. The last section asked respondents to self-report their research outcome between 2008-2013. Both versions of the questionnaire, the Arabic and the English, were combined within the same Web-based survey with a cover letter explaining the purpose and significance of the study. Out of 7,072 distributed questionnaires, 389 usable answered questionnaires were used for the data analysis.

To remind the reader, the purpose of this study was to answer the following research question: How do research-promoting practices in Saudi public universities contribute to high levels of faculty research productivity? The following secondary questions were to be answered as well:

1. What research-promoting practices are significantly related to the level of faculty research productivity at Saudi Arabian public universities?

2. What personal characteristics are significantly related to the level of faculty research productivity at Saudi Arabian public universities?

Variables in the Study

Dependent Variable

Faculty research productivity was the dependent variable in this study, and it was measured by quantifying faculty research outcomes in the 5 years since 2008. Therefore, this study focused on the quantity of faculty research productivity rather than its quality. That is

because quantity has been considered the simplest and most useful way of evaluating faculty research productivity, as it concerns publication count or the number of pages produced by faculty (Alli, 2002; Kim et al., 2011; Ramsden, 1990; Zainab, 2000). Publication count was defined by Teodorescu (1995) as the number of journal articles, books, monographs, chapters in books, and papers presented at professional conferences.

In this study, faculty research productivity was measured by the numbers of scholarly works in 5 years since 2008, for the following seven types of research activities:

- Overall research productivity.
- Numbers of published articles in refereed journals.
- Numbers of published articles in professional journals.
- Numbers of presented papers in scientific conferences.
- Numbers of published books.
- Numbers of edited and translated books.
- Numbers of published book chapters.

The faculty was asked to respond to this question by selecting one option from the following listed options to describe their research outcome for each type of research activities:

- Never published (coded as 0)
- Had published 1-2 (coded as 1)
- Had published 3-4 (coded as 2)
- Had published 5-6 (coded as 3)
- Had published above 6 (was coded as 4)

After collecting information about the six measures of research productivity, *overall research productivity* was added to the study as a seventh measure of faculty research productivity during

the data analysis stage by adding the means of all six measures of research activity (reported by respondents) divided by six. A new column was created in the data set for the faculty overall research productivity using Statistical Package for the Social Sciences (SPSS)®. The purpose of creating this new measurement was to capture the variance in faculty overall research productivity in addition to the six types of research activities reported by respondents.

Independent Variables

Obtained from previous literature, two blocks of factors were selected to be the independent variables in this study. They are *research-promoting practices* and *personal characteristics*.

Research-promoting practice. The following five variables were selected to operationalize this construct:

- Supportive collegial environment and research climate.
- Research support services.
- Participation in collaboration programs.
- Conference attendance.
- Administrative and teaching workload.

Personal characteristics. The following six variables were used to operationalize this construct: gender, age, marital status, citizenship, academic rank, and origin of PhD degree.

The following are detailed descriptions of the operationalization of the study variables, and the hypotheses to be tested.

Research-promoting practices.

Supportive collegial environment and research climate. Four subvariables were used to measure this variable. Respondents were asked to indicate the degree of their agreement or

disagreement with several statements, intended to describe the collegial environment and research climate at four public universities, by choosing the most correct response reflecting their opinion: (a) Strongly disagree, (b) Disagree, (c) Agree, (d) Strongly agree, (e) I don't know. The "I don't know" option was removed later during the data analysis because excluding this option would produce a greater volume of accurate data. Table 3 illustrates how the survey questions were formulated to measure respondents' perceptions on the collegial environment and research climate at their universities.

Table 3

Variables Associated With University Support for Collegial Environment and Research Climate

Independent variables	Survey questions	Hypotheses
Perception of the collegial academic atmosphere which encourages the exchange of ideas among faculty members.	1. The current academic environment stimulates me to do more research with my colleagues. 2. The level of intellectual stimulation in my day-to-day contacts with faculty colleagues is satisfactory. 3. In the current academic work setting, I can cooperate in research work effectively with opposite sex colleagues. 4. Visiting scholars programs positively impacts research outcomes of the faculty members. 5. My university enables me to contribute to the theoretical developments of my discipline autonomously. 12. Academic freedom level at the university allows faculty to do research without restrictions.	**H1a:** Respondents reporting a positive perception of their academic atmosphere will report a higher level of research productivity. **H1b:** Respondents reporting a positive perception of intellectual stimulation in the daily contacts with colleagues will report a higher level of research productivity. **H1c:** Respondents reporting a positive perception of research cooperation with opposite sex colleagues will report a higher level of research productivity. **H1d:** Respondents reporting a positive perception of visiting scholar programs will report a higher level of research productivity. **H1e:** Respondents reporting a positive perception of academic freedom will report a higher level of research productivity.
Perception of the university publication report.	6. Publishing in refereed journals is promoted by my	**H2a:** Respondents reporting a positive perception of the

Table 3 - continued

Independent variables	Survey questions	Hypotheses
	university. 9. Financial incentives for scientific publication provided by the university stimulates me to engage in research work. 11. A faculty member is encouraged to conduct research in English language at the university. 8. The administrative procedures I have to follow to request research funding in my university are simple.	university support for publications in refereed journals will report a higher level of research productivity. **H2b:** Respondents reporting a positive perception of the financial incentives for research will report a higher level of research productivity. **H2c:** Respondents reporting a positive perception of university support to publications in English will report a higher level of research productivity. **H2d:** Respondents reporting a positive perception of the research funding process will report a higher level of research productivity.
Perception of promotion potential.	7. The promotion system in Saudi universities encourages faculty members to be more research productive.	**H3:** Respondents reporting a positive perception of promotion potential will report a higher level of research productivity.
Perception of research centers.	10. Research centers in the university support faculty members' research projects.	**H4:** Respondents reporting a positive perception of the role of research centers will report a higher level of research productivity.

Research support services. Eight variables were used to measure respondents' perception of the importance of the *research support services* provided by the university. Respondents were asked to indicate the degree of their beliefs of the importance of the following listed research services in promoting faculty research productivity. Respondents chose one of the following responses that reflected their opinion about the services:

- Not important at all (coded as 1).

- Not very important (coded as 2).
- Important (coded as 3).
- Very important (coded as 4).

Table 4 illustrates how the survey questions were formulated to measure the respondents' perceptions of the importance of the research services in their universities.

Table 4

Variables Associated With the Research Support Services

Independent variables	Survey questions	Hypotheses
Perception of the importance of the course release time.	14. Do you believe that the following research services are important to promote research productivity among faculty members in your university? (a) Course release time.	**H5a:** Respondents reporting a higher perception of the importance of the course release time to conduct research will report a higher level of research productivity.
Perception of the importance of research assistant.	14. Do you believe that the following research services are important to promote research productivity among faculty members in your university? (b) Availability of research Assistant.	**H5b:** Respondents reporting a higher perception of the importance of the research assistant to conduct research will report a higher level of research productivity.
Perception of the importance of research funding.	14. Do you believe that the Following research services are important to promote research productivity among faculty members in your university? (c) Research funding.	**H5c:** Respondents reporting a higher perception of the importance of the research funding to conduct research Will report a higher level of Research productivity.
Perception of the importance of sabbatical leave.	14. Do you believe that the Following research services are important to promote research productivity among faculty members in your university? (d) Sabbatical leave.	**H5d:** Respondents reporting a higher perception of the importance of the sabbatical leave to conduct research will Report a higher level of Research productivity.
Perception of the importance of the access to academic library.	14. Do you believe that the following research services are Important to promote research productivity among faculty	**H5e:** Respondents reporting a higher perception of the importance of accessing an academic library to conduct

Table 4 – continued

Independent variables	Survey questions	Hypotheses
	members in your university? (e) Access to academic library.	Research will report a higher Level of research productivity.
Perception of the importance of the access to computers.	14. Do you believe that the Following research services are important to promote research productivity among faculty members in your university? (f) Access to computers.	**H5f:** Respondents reporting a higher perception of the importance of accessing computers to conduct research Will report a higher level of Research productivity.
Perception of the importance of access to labs.	14. Do you believe that the Following research services are important to promote research productivity among faculty members in your university? (g) Access to labs.	**H5g:** Respondents reporting a higher perception of the importance of accessing labs to conduct research will Report a higher level of Research productivity.
Perception of the importance of the academic translation and editing services.	14. Do you believe that the following research services are Important to promote research productivity among faculty members in your university? (h) Academic translation and editing services.	**H5h:** Respondents reporting a higher perception of the importance of the academic translation and editing services To conduct research will report a higher level of research Productivity.

***Participation in collaboration programs*.** Respondents were asked about their participation in collaboration programs inside and outside their universities between 2008-2013. Table 5 illustrates how a survey question was formulated to measure this variable.

***Conference attendance*.** Respondents were asked about the number of the conferences they attended per year. Table 6 illustrates how the survey question was phrased to measure this variable.

***Teaching and administrative workloads*:** Respondents were asked about their average teaching hours per semester. Also they were asked about the time they spent working on

administrative tasks. Tables 7 and 8 illustrate how the survey questions were phrased to measure the variables.

Table 5

Participation in Collaboration Programs

Independent variable	Survey question	Hypothesis
Participation in collaboration programs.	17. How many times have you Participated in collaboration programs during 5 years since 2008 inside and outside your present university? •None (coded 1) •1-2 times (coded 2) •3-4 times (coded 3) •5-6 times (coded 4) •7 times and more (coded 5)	**H6:** Respondents reporting a higher rate of participation in collaboration programs will report a higher level of Research productivity.

Table 6

Conference Attendance

Independent variable	Survey question	Hypothesis
Conference attendance.	30. How many times do you attend scientific conferences and academic workshops per year? •None (coded 1) •1-2 times (coded 2) •3-4 times (coded 3) •5-6 times (coded 4) •7 times and more (coded 5)	**H7:** Respondents reporting a higher rate of conference attendance will report a Higher level of research productivity.

Table 7

Teaching Workload

Independent variable	Survey question	Hypothesis
Teaching workload.	32. What is your typical teaching load each semester (how many credit hours)? •Under 3 hours (coded 1) •3-6 hours (coded 2) •7-9 hours (coded 3) •10-12 hours (coded 4) •13 hours and above (coded 5)	**H8a:** Respondents reporting reporting fewer teaching hours Will report a higher level of research productivity.

Table 8

Administrative Workload

Independent variable	Survey question	Hypothesis
Administrative workload.	33. The weekly hours you spend working on administrative tasks such as correcting exams, submitting degrees, etc. •Under 5 hours (coded 1) •5-10 hours (coded 2) •11-15 hours (coded 3) •16-20 hours (coded 4) •More than 20 hours (coded 5)	**H8b:** Respondents reporting less administrative work will report a higher level of research productivity.

Personal characteristics. These are the individual characteristics of the respondents. Respondents were asked to report information about their gender, age, marital status, origin of PhD degree, academic rank, and citizenship. Table 9 illustrates how the survey questions were phrased to measure each of the personal characteristics.

Conceptual Framework for the Study

The conceptual framework for this study stems from the perspective of human capital investment. The study proposed that implementing a management system in an institution with embedded practices that aim to make the most of employees' talent and skills can stimulate workers' productivity. This study argued that implementing practices that promote research in universities represents an investment mechanism that can stimulate faculty research productivity. Figure 2 depicts the conceptual framework of the study. The first block of the independent variables is a cluster of five research-promoting practices that include supportive collegial environment and research climate, research support services, participation in collaboration programs, teaching and administrative workload, and conference attendance. The second block

of independent variables consists of six personal characteristics. Research productivity is the dependent variable and was operationalized using seven measurements.

Table 9

Personal Characteristics

Independent variables	Survey questions	Hypotheses
Gender	19. Your gender •Male (coded 1) •Female (coded 2)	**H9:** Male respondents have a higher level of research productivity. .
Age	22. Which category below includes your age? •≥30-40 years (coded 1) •41-50 years (coded 2) •51-61 years ≤ (coded 3)	**H10:** Older respondents have A higher level of research productivity.
Marital status	20. What is your marital status? •Single (coded 1) •Married (coded 2) •Widowed (coded 3) •Divorced (coded 4)	**H11:** Married respondents have a lower level of research productivity.
Academic rank	23. What is your current academic rank? •Assistant professor (coded 1) •Associate professor (coded 2) •Full professor (coded 3)	**H12:** Respondents reporting A higher academic rank will report a higher level of research productivity.
Citizenship/tenure status	29. Region of citizenship •Saudi (coded 1) •Arab (coded 2) •Asian (coded 3) •Western (coded 4)	**H13:** Tenured faculty will report a lower level of research productivity.
Origin of PhD degree	24. What is the origin of your PhD degree? •Saudi university (coded 1) •Middle Eastern university (coded 2) •Asian university (coded 3) •Western university (coded 4)	**H14:** Respondents holding PhD degrees from Saudi universities will report a lower level of research productivity.

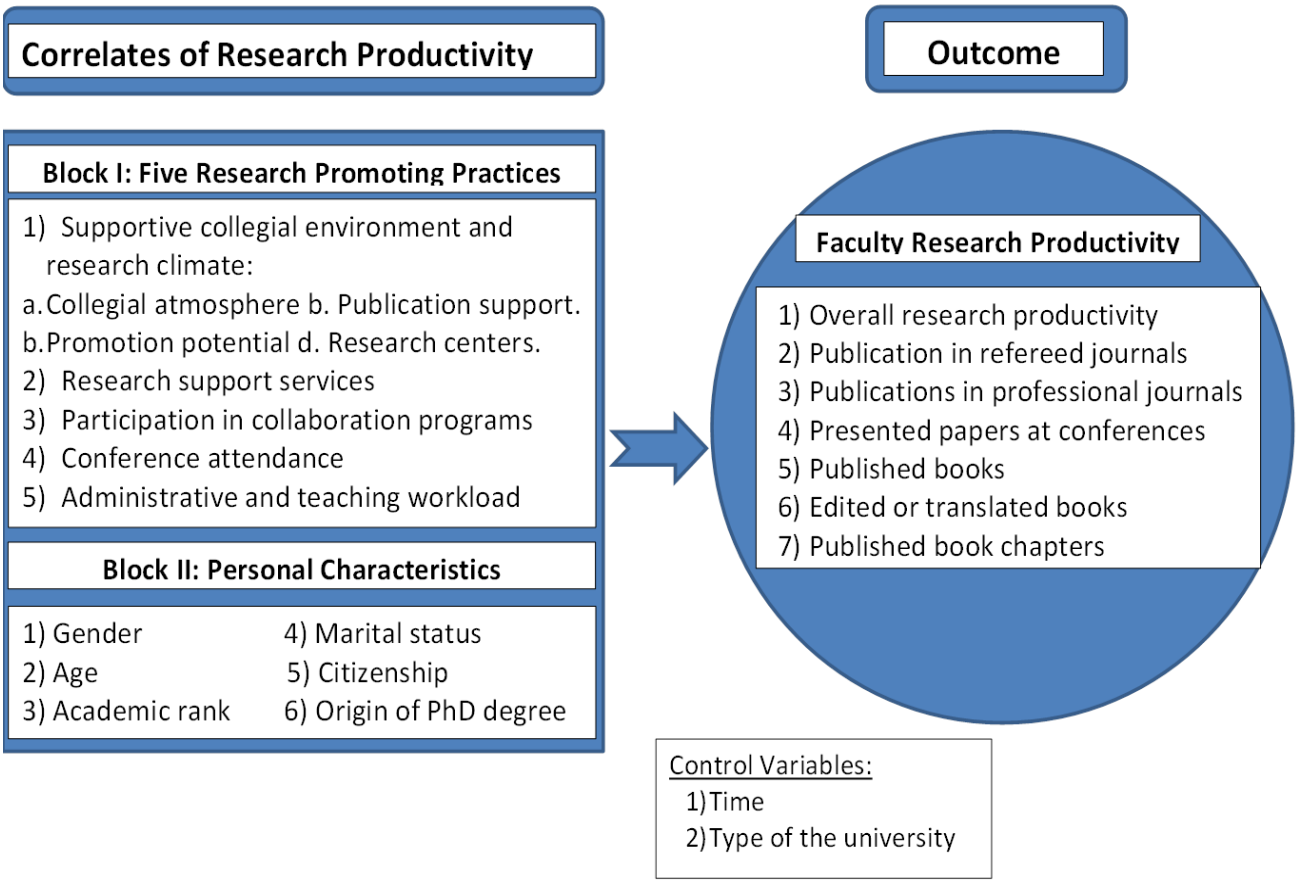


Figure 2. University investment in human capital and faculty research productivity.

Statistical Analysis

Beam (1976) indicated that most literature about faculty research productivity used institutional factors and personal characteristics as two main groups of correlates to faculty research productivity. These factors were generally investigated using various statistical analysis tools such as univariate analysis (ANOVA and *t*-test), and multivariate analysis (correlation, and multiple regression analysis).

In addition to descriptive statistics, this study used the *t*-test for equality of means for nominal level variables with two groups. Analysis of variance (ANOVA) was used to examine the variation in faculty research outcomes. To explore the relationship between independent and

dependent variables, this study used multiple linear regressions to provide a predictive model of faculty research productivity at Saudi Arabian public universities. The .05 alpha level was chosen as the significance level for this study.

The next chapter discusses the descriptive analysis of the collected data, and the results of the multiple linear regression analysis.

CHAPTER V

ANALYSIS AND INTERPRETATION OF THE DATA

The purpose of this study, as stated in Chapter I, was to answer the following question: Does the current research-promoting practices at Saudi public universities provide a high level of faculty research productivity?

The study aimed at addressing this question from the perspective of investment in human capital by examining the relationships among several independent variables and faculty research productivity at four Saudi Arabian public universities. Data were collected from faculty members working at these universities using a Web-based survey questionnaire. The analysis results of the collected data are discussed in this chapter which is divided into two sections. The first section is a discussion of the descriptive characteristics of the study sample. In the first half of second section, *t*-test and ANOVA results are reviewed to determine the significant differences existing among the study groups. The second half of the second section is a presentation of the results of the multiple regressions analysis.

Descriptive Statistics

Out of 7,072 distributed questionnaires, 604 questionnaires were collected and 389 of them were usable for the data analysis. The data reveals that of 389 respondents, 30% were female and 70% were male as shown in Table 10. Table 11 shows that the majority of the faculty members (93%) were married while (3%) were single. Table 12 shows that the heaviest

population of the faculty members were 41 to 50 years (38 %). Thirty-six percent were 51 to 60 years ≥, and 25% were 30 ≤ to 40 years.

Table 10

Respondents' Gender

		Frequency	%
Valid	Female	116	29.8
	Male	273	70.2
	Total	389	100.0

Table 11

Respondents' Marital Status

		Frequency	%
Valid	Single	12	3.1
	Married	364	93.6
	Widowed	6	1.5
	Divorced	7	1.8
	Total	389	100.0

Table 12

Respondents' Age

	Faculty age	Frequency	%
Valid	30 or younger-40 years	97	25
	41-50 years	149	38.3
	51-60 years and older	143	36.1
	Total	389	100.0

The frequency distribution of respondents by rank in Table 13 shows that the majority of faculty members were assistant professors (46%), followed by associate professors (28%), and lastly 26% were the full professors.

Table 13

Respondents' Academic Rank

		Frequency	%
Valid	Assistant professor	181	46.5
	Associate professor	108	27.8
	Professor	100	25.7
	Total	389	100.0

In terms of citizenship, Table 14 shows that 66% of faculty members were Saudis. Arabs came second at (26%), while Asians and Westerners represented 6% and 3%, respectively, of the academic faculty staff.

Table 14

Respondents' Citizenship

		Frequency	%
Valid	Saudi	256	65.8
	Arab	101	26.0
	Asian	22	5.7
	Westerners	10	2.6
	Total	389	100.0

Table 15 shows that the majority of the tenured faculty (Saudis) were assistant professors (66%), while full professors represented 65% of the tenured faculty (Saudis). Nontenured faculty represented almost 35% of the total number of the full professors in the study sample.

Table 15

Ratio of Faculty Members' Tenure Status to Their Academic Rank

	Tenured status		
Academic rank	Tenured (%)	Nontenured (%)	Total (%)
Assistant Professor	119 (65.7)	62 (34.3)	181(100)
Associate Professor	72 (66.7)	36 (33.3)	108 (100)
Professor	65 (65.0)	35 (35.0)	100 (100)
Total	256 (65.8)	133 (34.2)	389 (100)

Table 16 shows that 71% of faculty members aged over 51 were tenured (Saudis), while 41% of faculty members aged 41-50 were nontenured. The majority of faculty aged ≤ 40 were tenured faculty.

Table 16

Ratio of Faculty's Age to Their Tenure Status

	Tenured status		
Age	Tenured (%)	Nontenured (%)	Total (%)
≤ 30-40	67 (69.1)	30 (30.9)	97 (100)
41-50	88 (59.1)	61 (40.9)	149 (100)
51-60 ≥	101 (70.6)	42 (29.4)	143 (100)
Total	256 (65.8)	133 (34.2)	389 (100)

Table 17 shows that the majority of faculty (55%) received their PhD degrees from Western universities (American, European, and Australian). Twenty-two percent received their degrees from Saudi universities, and 16% obtained their degrees from Middle Eastern universities. Finally, 7% of faculty received their degrees from Asian universities.

Table 17

Respondents' Origin of PhD Degree

		Frequency	%
Valid	Saudi	85	21.9
	Middle Eastern	63	16.2
	Asian	26	6.7
	Western	215	55.3
	Total	389	100.0

Table 18 shows that almost 57% of respondents indicated they did not participate in any collaboration programs at their universities in the 5 years since 2008. Over 33% pointed out they participated at least once, and almost 2% reported they participated more than seven times in collaboration programs.

Table 18

Respondents' Participation in Collaboration Programs

		Frequency	%
Valid	None	224	57.6
	1-2 times	129	33.2
	3-4 times	24	6.2
	5-6 times	5	1.3
	More than 7 times	7	1.8
	Total	389	100.0

Table 19 shows that, of the total respondents, to the question about the frequency of their conference attendance, over 58% reported they attended an academic conference at least once a year. Eight percent of faculty indicated they never attended any conference, and 7% of faculty indicated they attended more than seven conferences a year.

Table 19

Respondents' Conference Attendance

		Frequency	%
Valid	Never attend	31	8.0
	1-2 times	228	58.6
	3-4 times	86	22.1
	5-6 times	14	3.6
	More than 7 times	30	7.7
	Total	389	100.0

In Table 20, the majority of respondents reported they had more than 10 teaching hours per semester, while 15% had between 7 and 9 teaching hours per semester. Thirteen percent reported they had between 3 and 6 teaching hours per semester.

Table 21 shows that almost 34% of faculty members reported they spent between 5 and 10 hours per week working on administrative tasks such as correcting exams, serving on committees, submitting grades etc. Over 20% indicated they spent less than 5 hours per week

Table 20

Respondents' Teaching Workload Per Semester

		Frequency	%
Valid	Under 3 hours	3	.8
	3-6 hours	51	13.1
	7-9 hours	59	15.2
	10-12 hours	139	35.7
	13 hours and over	137	35.2
	Total	389	100.0

Table 21

Respondents' Weekly Administrative Workload

		Frequency	%
Valid	Under 5 hours	79	20.3
	5-10 hours	132	33.9
	11-15 hours	89	22.9
	16-20 hours	36	9.3
	Over 20 hours	53	13.6
	Total	389	100.0

working on the same tasks, while 13% reported they spent more than 20 hours per week on administrative tasks.

Table 22 shows the variation in the academic disciplines of respondents. Thirty-five percent of the respondents were natural sciences and engineering faculty, while 25% were medical and health sciences faculty. Technical studies faculty represented 7% of the total number of the faculty who participated in the survey.

Analysis of Means

To explore how faculty research productivity varies by gender, age, academic rank, and tenure status (citizenship), two tests were used. The first was *t*-test for equality of means which was used to explore research productivity differences by gender.

Table 22

Respondents By Academic Disciplines

		Frequency	%
Valid	Medicine and Health Sciences	98	25.2
	Social Sciences	63	16.2
	Natural Sciences and Engineering	135	34.7
	Humanities and Arts	64	16.5
	Technology and Technical Studies	29	7.5
	Total	389	100.0

The second test was the analysis of variance (ANOVA) which was used to test variables with more than two groups.

Research Productivity by Gender

The test was run separately for each of the seven types of the dependent variable. The hypothesis tested was:

H9: Male respondents have a higher level of research productivity.

Pertinent data are as follows. Table 23 shows that results of Levene's Test for Equality of Variance revealed that the variability in the two groups is different = .648. This means that the variance within the two groups is equal. And since the 2-tailed value is more than .05, we can conclude that there is no statistically significant difference between male and female in overall research productivity. Thus, we conclude that results do not support the stated hypothesis and that an alternative hypothesis must be proposed. However, although the 2-tailed value =.06 is not statistically significant, it does not indicate a total absence of evidence. But rather, .06

Table 23

Differences in Overall Research Productivity by Gender

	Gender	*N*	Mean	SD
Overall research productivity	Female	116	1.0287	.72308
	Male	273	1.2564	.74452

Levene's Test for Equality of Variances p = .648; t-test sig. (2-tailed test) = .06.

probability means that the hypothesis still has a 94% chance of being true which is not far different from 95%. Therefore, these results can be of importance for future studies that investigate the differences in the overall research productivity between male and female.

Table 24 shows that the results of Levene's Test for Equality of Variance indicated that variability in the two groups is significantly different = .15. This means that the variance within the two groups is equal. However, 2-tailed value is less than .05; therefore, we can conclude that there is a statistically significant difference between male and female in number of publications in refereed journals. According to this result, male (M = 2.72) published more articles in refereed journals than female (M = 2.22). Differences between the means are likely due to the independent variables influence. Based on the statistical evidence, we concluded that results support the stated hypothesis. For published articles in professional journals, results of Levene's Test for Equality of Variance show that the variability in the two groups is significantly different, $.005 \leq$, which means that the groups are not homogeneous (see Appendix B). So we used the results of the unequal variance and concluded that the difference in means between male and female is not significant.

Table 24

Differences in Publications in Refereed Journals by Gender

	Gender	*N*	Mean	SD
Published articles in refereed journals	Female	116	2.2241	1.49251
	Male	273	2.7216	1.38909

Levene's Test for Equality of Variances p = .150; t-test sig. (2-tailed test) = .002.

Also, the results of Levene's Test for Equality of Variance for published books show that the variability in the two groups is not significantly different (.094). This means that the variance within the two groups is equal (see Appendix B). However, since 2-tailed value = .295, we can conclude that there is no statistically significant difference between male and female.

For edited and translated books and book chapters, the results of Levene's Test for Equality of Variance for both types show that the variability in the two groups is less than .05 which means that the groups are not homogeneous (see Appendix B). So we used the results of the unequal variance and concluded that the mean between male and female is not significantly different.

Table 25 shows that the results of Levene's Test for Equality of Variance reveal that the variability in the two groups is significantly different = .799. This means that the variance within two groups is equal. However, since 2-tailed *p* value = .215, we can conclude that there is no statistically significant difference between male and female in the numbers of presented papers at scientific conferences.

Table 25

Differences in Presented Papers at Conferences by Gender

	Gender	*N*	Mean	SD
Presented papers in scientific conferences	Female	116	1.8621	1.46790
	Male	273	2.0659	1.48870

Levene's Test for Equality of Variances $p = .799$; *t*-test sig. (2-tailed test) = .215.

Research Differences By Age

ANOVA statistical test was used to measure the differences in research productivity among faculty age groups. Three groups were selected to measure age (30 or younger-40, 41-50, 51-60 or older). The hypothesis tested was:

H10: Older respondents have a higher level of research productivity.

The test was run for each of the seven types of the dependent variable. The only statistically significant model for this variable was the publications in refereed journals, as the peak of productivity was attained by faculty aged 51 and older, with lower levels of productivity for faculty aged 40 and younger. Statistical results in Table 26 reveal that faculty aged 51-60 ≥ had

Table 26

Differences in Publications in Refereed Journals by Age

(I) 22. Which category below includes your age?	(J) (I) 22. Which category below includes your age?	Mean difference (I-J)	Std. Error	Sig.
≤ 30-40	41-50	-.55871	.18368	.007
	51-60 ≥	-78098	.18519	.000
41-50	≤ 30-40	.55871	.18368	.007
	51-60 ≥	-.22227	.16482	.369
51-60 ≥	≤ 30-40	.78098	.18519	.000
	41-50	.22227	.16482	.369

the highest research productivity with a mean of (.781), followed by faculty aged 41-50 with a mean of .559. The statistical evidence suggests that older faculty published more articles in refereed journals than younger faculty. Based on the statistical evidence of this model, we concluded that results supported the stated hypothesis. This finding matches results from several studies on publication productivity (Hedjazi & Behravan, 2011; Hesli & Lee, 2011; Teodorescu, 2000). There were no statistically significant differences among age groups in the following models: overall productivity, publications in professional journals, published books, published edited and translated books, published book chapters, and papers presented at scientific conferences (Appendix B).

Research Productivity by Marital Status

ANOVA test was used to find significant differences among the following four groups measuring faculty marital status: married, divorced, single, and widow. The hypothesis tested was:

H11: Married respondents have a lower level of research productivity.

ANOVA test was run for the seven types of faulty research productivity, and results showed no statistically significant differences at ≤ .005 among marital status groups (see Appendix B).

Research Differences by Academic Rank

To determine research productivity variation among academic rank groups, the ANOVA test was run to explore significant differences in the means of three groups of the academic ranks: assistant professor, associate professor, and full professor. The hypothesis tested was:

H12: Respondents reporting a higher academic rank will report a higher level of research productivity.

Based on the results, statistically significant differences were found at ≤ .005 among academic rank groups in all types of research productivity, except in terms of edited and translated books. Full professors had the highest level of research productivity, followed by associate professors, then assistant professors. Because we have statistically significant results, a Tukey post hoc test was computed. This test is designed to compare each one of the groups to every other group. Below are the pertinent results and interpretation. Table 27 shows the overall research productivity differences among academic ranks. Post hoc comparisons using the Tukey HSD test indicated that the mean score for full professors was significantly higher in overall research productivity than assistant professors (M = .803, SD = .081) and associate professors (M = .22, SD = 0.091).

In the second significant model, the mean scores of full professors were significantly higher in terms of numbers of publications in refereed journals compared to assistant professors (M = 1.6, SD = .153). Associate professors (M = 1.42, SD = 0.149) have significantly higher publications in refereed journals compared to assistants professors. Table 28 shows the differences in publications in refereed journals by academic rank.

Table 27

*Differences in Overall Research Productivity by Academic Rank**

(I) 23. Academic rank	(J) 23. Academic rank	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	Upper bound
Assistant Professor	Associate Professor	-.58234**	.07991	.000	-.7704	-.3943
	Professor	-.80289**	.08189	.000	-.9956	-.6102
Associate Professor	Assistant Professor	.58234**	.07991	.000	.3943	.7704
	Professor	-.22056**	.09121	.042	-.4352	-.0060
Professor	Assistant Professor	.80289**	.08189	.000	.6102	.9956
	Associate Professor	.22056**	.09121	.042	.0060	.4352

* Dependent variable: Overall research productivity.

**The mean difference is significant at the 0.05 level.

Table 28

*Differences in Publications in Refereed Journals by Academic Rank**
(Tukey HSD)

(I) 23. Academic rank	(J) 23. Academic rank	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	Upper bound
Assistant Professor	Associate Professor	-1.41723**	.14903	.000	-1.7679	-1.0666
	Professor	-1.60204**	.15272	.000	-1.9614	-1.2427
Associate Professor	Assistant Professor	1.41723**	.14903	.000	1.0666	1.7679
	Professor	-.18481	.17009	.523	-.5850	.2154
Professor	Assistant Professor	1.60204**	.15272	.000	1.2427	1.9614
	Associate Professor	.18481	.17009	.523	-.2154	.5850

* Dependent variable: Published articles in refereed journals.

**The mean difference is significant at the 0.05 level.

Similarly, results in Table 29 show that the mean scores for full professors were significantly higher in terms of number of publications in professional journals compared to assistant professors (*M* = 1.1, SD = .187). Associate professors had more publications in professional journals than assistant professors (*M* = .818, SD = 0.182). In Table 30, results show that mean scores of full professors were significantly higher in terms of published books compared to assistant professors (*M* = .503, SD = .099). Also, there was a significant difference in numbers of published books between associate professors and assistant professors (*M* =. 27, SD = 0.11). According to the results in Table 31, there were no significant differences among academic rank groups in terms of published edited and translated books. In Table 32, results show that the mean scores of full professors were significantly higher in terms of publishing books chapters compared to assistant professors (*M* = .322, SD = .11). However, there was no statistically significant difference between full professors and associate professors in terms of publishing book chapters. Results in Table 33 show that the mean scores of professors were significantly higher in terms of numbers of presenting papers at conferences compared to assistant professors (*M* = 1.13, SD = .176) and associate professors (*M* = .494, SD = 0.196).

Similar results were found in previous literature suggesting that research performance of higher ranked scientists is greater than the lower ranked (Abramo et al., 2011; Alghamdi, 2002; Creswell, 1985; Tein & Blackburn, 1996). Promotion to higher ranks is associated with a pay upgrade. Therefore, promotion policies in universities are strong and enforcing factors that usually motivate faculty to conduct a minimum number of research works within a certain period of time. The cumulative research experience a faculty member gained during his/her early career stage would demonstrate an excellent research performance when he/she reaches senior level. So, it is expected that higher ranked faculty have more publications than the lower ranked

Table 29

*Differences in Publications in Professional Journals by Academic Rank**
(Tukey HSD)

(I) 23. Academic rank	(J) 23. Academic rank	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	Upper bound
Assistant Professor	Associate Professor	-.81763**	.18200	.000	-1.2458	-.3894
	Professor	-1.07022**	.18651	.000	1.5090	-.6314
Associate Professor	Assistant Professor	.81763**	.18200	.000	.3894	1.2458
	Professor	-.25259	20773	.444	-.7413	.2362
Professor	Assistant Professor	1.07022**	.18651	.000	.6314	1.5090
	Associate Professor	.25259	.20773	.444	.2362	.7413

* Dependent variable: Published articles in professional journals.

**The mean difference is significant at the 0.05 level.

Table 30

*Differences in Published Books by Academic Rank**
(Tukey HSD)

(I) 23. Academic rank	(J) 23. Academic rank	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	Upper bound
Assistant Professor	Associate Professor	-.27005**	.09669	.015	-.4976	-.0426
	Professor	-.50376**	.09909	.000	-.7369	-.2706
Associate Professor	Assistant Professor	.27005**	.09669	.015	.0426	.4976
	Professor	-.23370	.11036	.088	-.4934	.0260
Professor	Assistant Professor	.50376**	.09909	.000	.2706	.7369
	Associate Professor	.23370	.11036	.088	-.0260	.4934

* Dependent variable: Published books.

**The mean difference is significant at the 0.05 level.

Table 31

*Differences in Edited and Translated Books by Academic Rank**
(Tukey HSD)

(I) 23. Academic rank	(J) 23. Academic rank	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	Upper bound
Assistant Professor	Associate Professor	-.17342	.09309	.151	-.3924	.0456
	Professor	-.18453	.09540	.130	-.4090	.0399
Associate Professor	Assistant Professor	.17342	.09309	.151	-.0456	.3924
	Professor	-.01111	.10625	.994	-.2611	.2389
Professor	Assistant Professor	.18453	.09540	.130	-.0399	.4090
	Associate Professor	.01111	.10625	.994	-.2389	.2611

* Dependent variable: Edited and translated books.

**The mean difference is significant at the 0.05 level.

Table 32

Differences in Published Book Chapters by Academic Rank
(Tukey HD)

(I) 23. Academic rank	(J) 23. Academic rank	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	Upper bound
Assistant Professor	Associate Professor	-.17567	.11031	.250	-.4352	.0839
	Professor	-.32271**	.11304	.013	-.5887	-.0567
Associate Professor	Assistant Professor	.17567	.11031	.250	-.0839	.4352
	Professor	-.14704	.12590	.473	-.4433	.1492
Professor	Assistant Professor	.32271**	.11304	.013	.0567	.5887
	Associate Professor	.14704	.12590	.473	-.1492	.4433

* Dependent variable: Published book chapters.

**The mean difference is significant at the 0.05 level.

Table 33

Differences in Papers Presented at Scientific Conferences by Academic Rank
(Tukey HD)

(I) 23. Academic rank	(J) 23. Academic rank	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Assistant Professor	Associate Professor	-.64001**	.17137	.001	-1.0432	-.2368
	Professor	-1.13409**	.17561	.000	-1.5473	-.7209
Associate Professor	Assistant Professor	.64001**	.17137	.001	.2368	1.0432
	Professor	-.49407**	.19560	.032	-.9543	-.0339
Professor	Assistant Professor	1.13409**	.17561	.000	.7209	1.5473
	Associate Professor	.49407**	.19560	.032	.0339	.9543

* Dependent variable: Papers presented at scientific conferences.

**The mean difference is significant at the 0.05 level.

faculty. We can conclude that results support the stated hypothesis for all types of research productivity except for the edited and translated books model.

Research Differences by Citizenship (Tenure Status)

ANOVA was used to measure the research productivity differences among citizenship (tenure status) groups**.** Four groups were selected to measure citizenship: Saudi, Middle Eastern, Asian, and Westerner. To remind the reader, citizenship indicates faculty tenure status. Saudi faculty are assigned to tenured positions, while non-Saudis are assigned to nontenured positions. The study aimed at exploring research differences among faculty members based on their tenure status. The hypothesis tested was:

H13: Tenured faculty will report a lower level of research productivity.

Statistical evidence in Table 34 suggests that the overall research productivity of Saudi (tenured) faculty is lower than Arab faculty (M = -.256, SD = .086). A similar finding was corroborated by Alzahrani (1997) who observed that research productivity among Saudi faculty members is comparatively less than non-Saudi faculty. No statistical evidence indicated that there are differences in the means of overall research productivity among the other groups. Therefore, we can conclude that results support the stated hypothesis for this model. In terms of the numbers of publications in refereed journals, no statistical differences were found among the groups (see Appendix B).

Results in Table 35 suggest that Saudi (tenured) faculty published fewer articles in professional journals than Arab faculty (M = -.614, SD = .182). No other statistical evidence indicated any differences in means of publications in professional journals among the other groups. Therefore, we can conclude that results support the stated hypothesis for this model.

Table 34

Differences in Overall Research Productivity by Citizenship

(I) 29. Region of citizenship	(J) 29. Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Saudi	Arab	-.25608**	.08635	.017	-.4789	-.0333
	Asian	-.40625	.16328	.063	-.8275	.0150
	Westerner	-.20625	.23689	.820	-.8175	.4050
Arab	Saudi	.25608**	.08635	.017	.0333	.4789
	Asian	-.15017	.17291	.821	-.5963	.2960
	Westerner	.04983	.24363	.997	.5788	.6785
Asian	Saudi	.40625	.16328	.063	-.0150	.8275
	Arab	.15017	.17291	.821	-.2960	.5963
	Westerner	.20000	.28028	.892	-.5232	.9232
Westerner	Saudi	.20625	.23689	.820	-.4050	.8175
	Arab	-.04983	.24363	.997	-.6785	.5788
	Asian	-.20000	.28028	.892	-.9232	.5232

* Dependent variable: Overall research productivity.

**The mean difference is significant at the 0.05 level.

Table 35

*Differences in Publications in Professional Journals by Citizenship**
(Tukey HSD)

(I) 29. Region of citizenship	(J) 29. Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi	Arab	-.61394**	.18164	.004	-1.0826	-.1453
	Asian	-.66974	.34343	.209	-1.5559	.2164
	Westerner	.14844	.49827	.991	-1.1373	1.4341
Arab	Saudi	.61394**	.18164	.004	.1453	1.0826
	Asian	-.05581	.36369	.999	-.9942	.8826
	Westerner	.76238	.51245	.446	.5599	2.0846
Asian	Saudi	.66974	.34343	.209	-.2164	1.5559
	Arab	.05581	.36369	.999	-.8826	.9942
	Westerner	.81818	.58954	.508	-.7030	2.3394
Westerner	Saudi	-14844	0.49827	.991	-1.4341	1.1373
	Arab	-.76238	.51245	.446	-2.0846	.5599
	Asian	-.81818	.58954	.508	-2.3394	.7030

* Dependent variable: Published articles in professional journals.

**The mean difference is significant at the 0.05 level.

Statistical results in Table 36 suggest that Saudi (tenured) faculty published fewer book chapters than Asian faculty (M = -.664, SD = .2). Therefore, we can conclude that results support the stated hypothesis for this model. In terms of the numbers of the presented papers at conferences, no statistical evidence indicated any differences in the means among the groups (see Appendix B).

Research Differences by Origin of PhD Degree

ANOVA was used to measure the differences in means of research productivity among four faculty groups based on the origin of their PhD degrees. These groups are: Saudi universities, Middle East universities, Asia universities, and Western universities. The hypothesis tested was:

> **H14:** Respondents holding PhD degrees from Saudi universities will report a lower level of research productivity.

Pertinent results are discussed below.

In terms of overall research productivity, results show that there is statistical evidence that the overall research productivity of PhD holders graduated from Saudi universities is less than PhD graduates from Middle Eastern universities (M = -.384, SD = .122), and PhD graduates from Western universities (M = -.313, SD = .09). Therefore, we conclude that results support the stated hypothesis. No statistical evidence indicated that there are differences in the means of productivity among the other groups. Table 37 depicts the results.

Table 38 shows that faculty members that graduated from Saudi universities published fewer articles in refereed journals compared to other faculty member graduates with PhD degrees from Middle Eastern universities (M = -.64, SD = .236), Asian universities (M = -.894, SD =

Table 36

*Differences in Published Book Chapters By Citizenship**
(Tukey HSD)

(I) 29. Region of citizenship	(J) 29. Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi	Arab	-.12941	.10609	.615	-.4032	.1443
	Asian	-.66406**	.20059	.006	-1.1816	-.1465
	Westerner	-.46406	.29103	.383	-1.2150	.2869
Arab	Saudi	.12941	.10609	.615	-.1443	.4032
	Asian	-.53465	.21242	.059	-1.0828	.0135
	Westerner	-.33465	.29931	.679	-1.1070	.4377
Asian	Saudi	.66406**	.20059	.006	.1465	1.1816
	Arab	.53465	.21242	.059	-.0135	1.0828
	Westerner	.20000	.34434	.938	-.6885	1.0885
Westerner	Saudi	.46406	.29103	.383	-.2869	1.2150
	Arab	.33465	.29931	.679	-.4377	1.1070
	Asian	-2.0000	.34434	.938	-1.0885	.6885

* Dependent variable: Published book chapters.

**The mean difference is significant at the 0.05 level.

Table 37

Differences in Overall Research Productivity by Origin of PhD Degree

(Tukey HSD)

(I) 24. Origin of earned academic degree	(J) 24. Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Saudi	Middle Eastern	-.38403**	.12195	.010	-.6987	-.0694
	Asian	-.41425	.16440	.058	-.8385	.0100
	Western	-.31327**	.09399	.005	-.5558	-.0708
Middle Eastern	Saudi	.38403**	.12195	.010	.0694	.6987
	Asian	-.03022	.17099	.998	-.4714	.4110
	Western	.07076	.10509	.907	-.2004	.3419
Asian	Saudi	.41425	.16440	.058	-.0100	.8385
	Middle Eastern	.03022	.17099	.998	-.4110	.4714
	Western	.10098	.1532	.911	-.2920	.4940
Western	Saudi	.31327**	.09399	.005	.0708	.5558
	Middle Eastern	-.07076	.10509	.907	-.3419	.2004
	Asian	-.10098	.15232	.911	-.4940	.2920

* Dependent variable: Overall research productivity.

**The mean difference is significant at the 0.05 level.

Table 38

*Differences in Publications in Refereed Journals by Origin of PhD Degree**
(Tukey HSD)

(I) 24. Origin of earned academic degree	(J) 24. Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi	Middle Eastern	-.64015**	.23580	.035	-1.2486	-.0317
	Asian	-.89412**	.31787	.026	-1.7143	-.0739
	Western	-.54993**	.18173	.014	-1.0188	-.0810
Middle Eastern	Saudi	.64015**	.23580	.035	.0317	1.2486
	Asian	-.25397	.33061	.869	-1.1070	.5991
	Western	.09022	.20320	.971	-.4341	.6145
Asian	Saudi	.89412**	.31787	.026	.0739	1.7143
	Middle Eastern	.25397	.33061	.869	-.5991	1.1070
	Western	.34419	.29450	.647	-.4157	1.1041
Western	Saudi	.54993**	.18173	.014	.0810	1.0188
	Middle Eastern	.-.09022	.20320	.971	-.6145	.4341
	Asian	-.34419	.29450	.647	-1.1041	.4157

* Dependent variable: Published articles in refereed journals.

**The mean difference is significant at the 0.05 level.

.317), and Western universities (*M* = -.55, SD = .181). Based on these results we conclude that results support the stated hypothesis for this model.

Results in Table 39 show that PhD holders that graduated from Saudi universities published fewer articles in professional journals than PhD holders graduated from Middle Eastern universities (*M* = -.942, SD = .257) and Western universities (*M* = -.551, SD = .198). Based on these results, we conclude that results support the stated hypothesis for this model. In terms of published books, edited and translated books, and book chapters, no statistical differences were found among the groups (see Appendix B).

Table 40 shows that there is a statistical difference in means between faculty holding PhD degrees from Saudi universities and PhD holders graduated from Western universities (*M* = -.598, SD = .009). Therefore, we can conclude that results support the stated hypothesis for this model.

Regression Modeling and Results

Multiple regression analysis was used in this study to examine the relationships among faculty research productivity (as the dependent variable) and five research-promoting practices and six personal characteristics as (the independent variables). The regression was run seven times to explore the associations between the independent variables and each type of faculty research productivity. To remind the reader, these types are: overall research productivity, publications in refereed journals, publications in professional journals, published books, edited and translated books, published book chapters, and presented papers at academic conferences.

The Multiple Regression Models

Two blocks of independent variables were entered in the regression equations in the following order: (a) research-promoting practices, and (b) personal characteristics. Seven

Table 39

Differences in Publications in Professional Journals by Origin of PhD Degree

(Tukey HSD)

(I) 24. Origin of earned academic degree	(J) 24. Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Saudi	Middle Eastern	-.94248**	.25669	.002	-1.6048	-.2801
	Asian	-74163	.34604	.141	-1.6345	.1513
	Western	-.55075**	.19783	.029	-1.0612	-.0403
Middle Eastern	Saudi	94248**	.25669	.002	.2801	1.6048
	Asian	.20085	.35992	.944	-.7278	1.1295
	Western	.39173	.22121	.289	-.1790	.9625
Asian	Saudi	.74163	.34604	.141	-.1513	1.6345
	Middle Eastern	-.20085	.35992	.944	-1.1295	.7278
	Western	.19088	.32060	.933	-.6364	1.0181
Western	Saudi	.55075**	.19783	.029	.0403	1.0612
	Middle Eastern	-.39173	.22121	.289	-.9625	.1790
	Asian	-.19088	.32060	.933	-.1.0181	.6364

* Dependent variable: Published articles in professional journals.

**The mean difference is significant at the 0.05 level.

Table 40

Differences in Papers Presented at Conferences by Origin of PhD Degree

(Tukey HSD)

(I) 24. Origin of earned academic degree	(J) 24. Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi	Middle Eastern	-.34827	.24437	.484	-.9788	.2823
	Asian	-.45023	.32943	.521	-1.3002	.3998
	Western	-.59781**	.18833	.009	-1.0838	-.1119
Middle Eastern	Saudi	.34827	.24437	.484	-.2823	.9788
	Asian	-.10195	.34263	.991	-.9860	.7821
	Western	-.24954	.21058	.637	-.7929	.2938
Asian	Saudi	.45023	.32943	.521	-.3998	1.3002
	Middle Eastern	.10195	.34263	.991	-.7821	.9860
	Western	-.14758	.30521	.963	-.9351	.6399
Western	Saudi	.59781**	.18833	.009	.1119	1.0838
	Middle Eastern	.24954	.21058	.637	-.2938	.7929
	Asian	.14758	.30521	.963	-.6399	.9351

* Dependent variable: Papers presented at scientific conferences.

**The mean difference is significant at the 0.05 level.

regression models were run. For all the regression models there was independence of residuals, as assessed by a Durbin-Watson statistic. The following regression equations will be applied to each one of the seven predictive models of faculty research productivity:

y = β0 + β1 AE + β2IS - β3OS + β4 VS- β5CTD + β6 PRJ + β7 PS+ β8RF+β9 FI+ β10 RC + β11 EL+ β12 AF+ β13 CRT+ β14 RA+ β15 RF+ β16 SL + β17 AAL+ β18AC+ β19 AL+ β20 AETS + β21 CP + β22 CA+ β23 TL+ β24 AWL+ β25 G+ β26 MS+ β27 Age+ β 28AR+ β29OAD+ β30 C

Tables 41 to 47 summarize the results of the simple multiple regression analyses for each measurement of the dependent variable.

First model: Overall research productivity.

Table 41

Significant Correlates to Overall Research Productivity

Variables	Unstandardized coefficients B	Standardized coefficients Beta	Significance
Research centers ß10 RC	-.111	-.118	.036
Participation in collaboration programs B21 CP	.099	.108	.022
Conference attendance ß22 CA	.130	.169	.000
Age ß27	-.122	-.147	.006
Academic rank ß28 AR	.434	.481	.000

R^2 = .358; *R* = .598a; *F* = 6.510 ($p < .005$); Durbin-Watson = 1.973.

A first observation about Table 41 is that the power of the model to predict faculty overall research productivity is almost 36% (R squared = .358). This means that independent variables in the model can explain almost 36% of the variance in faculty overall research productivity. Also the multiple correlation coefficient R = .598 indicated an acceptable level of the correlation between the independent and dependent variables. Five independent variables added statistical significance to the prediction model. Academic rank was found to be the strongly correlated to faculty overall research productivity (beta =.48). Which means for each one unit increase in academic rank faculty overall research productivity increases by .48 units,

or, in other words, higher ranked faculty have higher levels of overall research productivity. The higher rates of participation in collaboration programs and conference attendance were both statistically and significantly correlated to faculty overall research productivity.

The perception of the role of research centers (beta = -.12) was found to have a negative relationship with faculty overall research productivity. This indicates that positive opinion about the role of research centers at the university correlated with a decrease in faculty overall research outcomes. Likewise, the results revealed that age was negatively associated with faculty overall research productivity (beta = -.15), which means that older faculty showed a decrease in their overall research outcomes. No statistically significant relationships were found between the other independent variables and response variable. Table 42 shows a summary of the tested hypotheses that proved statistically significant results at 95% confidence level for this model.

The coefficient of multiple determinations for multiple regressions always increases as additional regressor variables are added to the predictive model. Hence, adding more variables to the model equation can improve it even though the variables do not have a relationship with the response variable. That is because *p*-values are just one piece of information and we might be losing important information by automatically removing everything that is not significant in the regression model (Grace-Martin, 2015). Therefore, all the entered predictors in the multiple regression analysis were added to the prediction equation of the overall research productivity model as follows.

* $y = \beta 0 + \beta 1\ AE + \beta 2IS - \beta 3OS + \beta 4\ VS - \beta 5CTD + \beta 6\ PRJ + \beta 7\ PS + \beta 8RF + \beta 9\ FI + \beta 10\ RC + \beta 11\ EL + \beta 12\ AF + \beta 13\ CRT + \beta 14\ RA + \beta 15\ RF + \beta 16\ SL + \beta 17\ AAL + \beta 18AC + \beta 19\ AL + \beta 20\ AETS + \beta 21\ CP + \beta 22\ CA + \beta 23\ TL + \beta 24\ AWL + \beta 25\ G + \beta 26\ MS + \beta 27\ Age + \beta\ 28AR + \beta 29OAD + \beta 30\ C$

*This model equation was used for all the seven regression models in the study.

Table 42

Summary of Tested Hypotheses Proven Statistically Significant Results in the Overall Research Productivity Model

Variables	Hypotheses	Testing results
Perception of research centers (beta = .12).	**H4:** Respondents reporting a positive perception of the role of research centers will report a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Participation in collaboration programs (beta = .1).	**H6:** Respondents reporting a higher rate of participation in the collaboration programs will report a higher level of research productivity.	Results support the stated hypothesis.
Conference attendance programs (beta = .12)	**H7:** Respondents reporting a higher number of conferences attended will report a higher level of research productivity.	Results support the stated hypothesis.
Age (beta = .14)	**H10:** Older respondents have a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Academic rank (beta = .48).	**H12:** Respondents reporting a higher academic rank will report a higher level of research productivity.	Results support the stated hypothesis.

The prediction equation of the faculty overall research productivity is as follows:

y (Overall Research Productivity) = .013+ .063 (academic environment)+ .055 (Intellectual stimulation) - .032 (Working with opposite sex colleagues) + .055 (Visiting scholars programs) - .035(Able to contribute to theoretical developments in discipline) +.009 (Publishing in referee journals) - .031(Promotion system) +.008 (Administrative procedures for research funding) - .077 (Financial incentives for scientific publication) - .111 (Research centers) + .02 (Publish in English language) + .031 (Academic freedom level) - .006 (Course release time) - .02 (Research assistant)+ .086 (Research funding) - .05 (Sabbatical Leave) - .093 (Access to academic library) +.044 (Access to computers) + .094 (Access to labs) + .003 (Academic editing and translating services) + .099 (Participation in collaboration programs) + .13 (Conference attendance) - .055 (Teaching load) +.005 (Admin workload)

+ .002 (Gender) - .012 (Marital status) - .122 (age) + .434 (Academic rank) + .047 (Origin of PhD degree) + .198 (citizenship).

Second model: Publication in refereed journals.

Table 43

Significant Correlates to Publications in Refereed Journals

Variables	Unstandardized coefficients B	Standardized coefficients Beta	Significance
Perception of the academic environment ß1 AE	.400	.232	.000
Perception of financial incentives for scientific publication ß9 FI	-.235	-.141	.018
Perception of academic editing and translating services ß20 AETS	-.251	-.131	.008
Academic rank ß28 AR	.806	.463	.000

R^2 = .366; R = .605a; F = 6.745 (p < .005); Durbin-Watson = 2.065.

In this model, the independent variables explained up to 37% of the variation in the number of publications in refereed journals. Also, multiple correlation coefficients indicated a good level of the relationships between the variables (R = .6). Four independent variables were found significant in this model. Academic rank was found again to be strongly associated with faculty publications in refereed journals (beta = .46). Also, faculty perception of academic environment was positively correlated with the response variable (beta = .23). The results revealed a negative relationship between the positive perception of the financial rewards to conduct research and numbers of publications in refereed journals (beta = -.14). This means that the positive perception of the financial incentives is met by a decrease in the number of publications in refereed journals. Also, faculty who had a higher perception of the importance of editing and translation services in their universities revealed a similar decrease in the number of

publications in refereed journals (beta = -.13). No statistically significant relationships were found between the other independent variables and the response variable. Table 44 shows a summary of the tested hypotheses proven statistically significant results at a 95% confidence level.

Table 44

Summary of Tested Hypotheses Proven Statistically Significant Results in Publications in Refereed Journals Model

Variables	Hypotheses	Testing results
Perception of the academic environment (beta = .23).	**H1a:** Respondents reporting a positive perception of their academic atmosphere will report a higher level of research productivity.	Results support the stated hypothesis.
Research support using financial incentives (beta = .14).	**H2b:** Respondents reporting a positive perception of the financial incentives for research will report a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Perception of the importance of the academic translation and editing service (beta = -.13).	**H5h:** Respondents reporting a higher perception of the importance of the academic translation and editing services to conduct research will report a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Academic rank (beta = .46).	**H12:** Respondents reporting a higher academic rank will report a higher level of research productivity.	Results support the stated hypothesis.

The equation for this model is as follows:

$$y = \beta 0 + \beta 1\ AE + \beta 2IS - \beta 3OS + \beta 4\ VS - \beta 5CTD + \beta 6\ PRJ + \beta 7\ PS + \beta 8RF + \beta 9\ FI + \beta 10\ RC + \beta 11\ EL + \beta 12\ AF + \beta 13\ CRT + \beta 14\ RA + \beta 15\ RF + \beta 16\ SL + \beta 17\ AAL + \beta 18AC + \beta 19\ AL + \beta 20\ AETS + \beta 21\ CP + \beta 22\ CA + \beta 23\ TL + \beta 24\ AWL + \beta 25\ G + \beta 26\ MS + \beta 27\ Age + \beta\ 28AR + \beta 29OAD + \beta 30\ C$$

y (Overall number of published articles in refereed journals)= .152+ .4 (academic environment) -.061 (Intellectual stimulation) -.126 (Working with opposite sex colleagues) + .059 (Visiting scholars programs) -.023 (Able to contribute to theoretical developments in discipline) + .027 (Publishing in

referee journals) - .062 (Promotion system) +.049 (Administrative procedures for research funding) - .235 (Financial incentives for scientific publication) - .076 (Research centers) + .116 (Publish in English language) + . 042 (Academic freedom level) - .123 (Course release time) -+ .26 (Research assistant)+ .029 (Research funding) - .169 (Sabbatical Leave) + .047 (Access to academic library) +.159 (Access to computers) + .271 (Access to labs) -.251 (Academic editing and translating services) + .115 (Participation in collaboration programs) + .039 (Conference attendance) - 0.02 (Teaching load) -.061 (Admin workload) + .096 (Gender) - .292 (Martial statutes) - .124 (Age) +. 806 (Academic rank) + .062 (Origin of PhD degree) + .179 (Citizenship).

Third model: Publications in professional journals. In the third model (Table 45), a multiple correlation of .44 was obtained among the independent variables and numbers of publications in professional journals. Five variables were found to be statistically and significantly associated with this model with coefficient of determination (R^2=.19), which means 19% of the variance in the number of publications in professional journals was explained by these correlates.

Table 45

Significant Correlates to Publications in Professional Journals

Variables	Unstandardized coefficients B	Standardized coefficients Beta	Significance
Faculty perception of intellectual stimulation ß2IS	.303	.140	.025
Conference attendance ß22 CA	.170	.104	.049
Age ß27	-.308	-.176	.003
Academic rank ß 28 AR	.677	.354	.000
Citizenship (tenure status) ß30 C	.331	.151	.005

R^2 = .190; R = .436a; F = 2.738 (p < .005); Durbin-Watson = 1.974.

Academic rank was found to be the highest correlate in the model to the response variable (beta = .35), which means that higher ranked faculty had a higher number of published articles in professional journals. Faculty's positive perceptions of the intellectual stimulation in the daily contacts with colleagues in the university and conference attendance both were found positively correlated to the response variable. Also, citizenship (tenure status) was found to be a correlate to the dependent variable, which suggests that tenure status was also a correlate to the number of publications in professional journals. Interestingly, age was found again to have a negative relationship with publication in professional journals (beta = -.18). This means that older faculty showed a decrease in the number of publications in professional journals. No significant relationships were found between the other independent variables and response variable in this model. Table 46 presents a summary of the tested hypotheses that showed significant relationships in this model.

The equation for this model is as follows:

$y = \beta 0 + \beta 1\ AE + \beta 2IS - \beta 3OS + \beta 4\ VS - \beta 5CTD + \beta 6\ PRJ + \beta 7\ PS + \beta 8RF + \beta 9\ FI + \beta 10\ RC + \beta 11\ EL + \beta 12\ AF + \beta 13\ CRT + \beta 14\ RA + \beta 15\ RF + \beta 16\ SL + \beta 17\ AAL + \beta 18AC + \beta 19\ AL + \beta 20\ AETS + \beta 21\ CP + \beta 22\ CA + \beta 23\ TL + \beta 24\ AWL + \beta 25\ G + \beta 26\ MS + \beta 27\ Age + \beta\ 28AR + \beta 29OAD + \beta 30\ C$

y (Overall number of published articles in professional journals)= - 1.482 + .42 (academic environment) + .303 (Intellectual stimulation) +.003 (Working with opposite sex colleagues) + .052 (Visiting scholars programs) -.047 (Able to contribute to theoretical developments in discipline) + .064 (Publishing in referee journals) - .119 (Promotion system) -.124 (Administrative procedures for research funding) + .027 (Financial incentives for scientific publication) - .07 (Research centers) + .166 (Publish in English language) - .114 (Academic freedom level) + .008 (Course release time) - .061 (Research assistant) + .119 (Research funding) + .039 (Sabbatical Leave) - .07 (Access to academic library) +.095 (Access to computers) + .185 (Access to labs) -.091 (Academic editing and translating services) + .051 (Participation in collaboration programs) + .17 (Conference attendance) - .098 (Teaching load) -.009

Table 46

Summary of Tested Hypotheses Proven Statistically Significant Results in Publications in Professional Journals Model

Variables	Hypotheses	Testing results
Perception of a collegial academic atmosphere which encourages the exchange of ideas among faculty members (beta = .14).	**H1b:** Respondents reporting a positive perception of intellectual stimulation in daily contacts with colleagues will report a higher level of research productivity.	Results support the stated hypothesis.
Conference attendance (beta = .14)	**H7:** Respondents reporting a higher number of conference attendances will report a higher level of research productivity.	Results support the stated hypothesis.
Age (beta = -.18)	**H10:** Older respondents have a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Academic rank (beta = .35).	**H12:** Respondents reporting a higher academic rank will report a higher level of research productivity.	Results support the stated hypothesis.
Citizenship (tenure) (beta = .15).	**H13:** Tenured faculty will report a lower level of research productivity.	Results support the stated hypothesis.

(Admin workload) + . 046 (Gender) + .164 (Martial statutes) - .308 (age) +. 677 (Academic rank) + .073 (Origin of PhD degree) + .331 (Citizenship).

Fourth model: Published books. In Table 47, a multiple correlation of .45 was obtained between the independent variables and the response variable. Six variables were found to be statistically and significantly associated with the model. Twenty percent of the variance in the number of published books can be explained by these correlates. In this model, academic rank was found to be the strongest correlate of the response variable (beta = .27), which means that higher ranked faculty had higher numbers of published books.

Table 47

Significant Correlates to Published Books

Variables	Unstandardized coefficients B	Standardized coefficients Beta	Significance
Faculty perception of research funding procedures ß8RF	.144	.162	.018
Faculty perception of research centers ß10 RC	-.179	-.173	.002
Perception of the importance of academic editing and translating services ß20 AETS	.190	.173	.002
Participation in collaboration programs ß21 CP	.132	.131	.013
Conference attendance ß22 CA	.130	.153	.003
Academic rank ß 28 AR	.269	.270	.000

R^2 = .206; R = .454a; F = 3.022 (p < .005); Durbin-Watson = 1.914.

The positive perception of the research funding procedures and the higher perception of the importance of academic editing and translating services were both positively correlated to the high numbers of published books. Similarly, participation in collaboration programs and conference attendance were found positively correlated to the dependent variable. However, the positive perception of the role of research centers in supporting research projects was found to have a negative relationship with the response variable, which means that positive perception of the research centers related to a decrease in the number of published books.

No statistically significant relationships were found between the other independent variables and the response variable. Table 48 shows a summary of the tested hypotheses which proved statistically significant results at a 95% confidence level.

Table 48

Summary of Tested Hypotheses Proven Statistically Significant Results in Published Book Model

Variables	Hypotheses	Testing results
Perception of research funding process (beta = .16).	**H2d:** Respondents reporting a positive perception of the research funding process will report a higher level of research productivity.	Results support the stated hypothesis.
Perception of research centers (beta = .17).	**H4:** Respondents reporting a positive perception of the role of research centers will report a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Perception of the importance of the academic translation and editing service (beta = -.17).	**H5h:** Respondents reporting a higher perception of the importance of the academic translation and editing services to conduct research will report a higher level of research productivity.	Results support the stated hypothesis.
Participation in collaboration programs (beta = .13).	**H6:** Respondents reporting a higher rate of participation in the collaboration programs will report a higher level of research productivity.	Results support the stated hypothesis.
Conference attendance (beta = .15)	**H7:** Respondents reporting a higher number of conference attendances will report a higher level of research productivity.	Results support the stated hypothesis.
Academic rank (beta = .27).	**H12:** Respondents reporting a higher academic rank will report a higher level of research productivity.	Results support the stated hypothesis.

The equation for this model is as follows:

$$y = \beta 0 + \beta 1\ AE + \beta 2IS - \beta 3OS + \beta 4\ VS - \beta 5CTD + \beta 6\ PRJ + \beta 7\ PS + \beta 8RF + \beta 9\ FI + \beta 10\ RC + \beta 11\ EL + \beta 12\ AF + \beta 13\ CRT + \beta 14\ RA + \beta 15\ RF + \beta 16\ SL + \beta 17\ AAL + \beta 18AC + \beta 19\ AL + \beta 20\ AETS + \beta 21\ CP + \beta 22\ CA + \beta 23\ TL + \beta 24\ AWL + \beta 25\ G + \beta 26\ MS + \beta 27\ Age + \beta\ 28AR + \beta 29OAD + \beta 30\ C$$

y (Overall number of published books)= .068 - .025 (academic environment) + .035 (Intellectual stimulation) -.03 (Working with opposite sex colleagues) - .027 (Visiting scholars programs) -.063 (Able to contribute to theoretical developments in discipline) + .001 (Publishing in referee journals) - .096

(Promotion system) + .144 (Administrative procedures for research funding) - .037 (Financial incentives for scientific publication) - .179 (Research centers) - .066 (Publish in English language) + .043 (Academic freedom level) + .022 (Course release time) - .125 (Research assistant)+ .071 (Research funding) - .052 (Sabbatical Leave) - .117 (Access to academic library) -.011 (Access to computers) + .035 (Access to labs) + .19 (Academic editing and translating services) + .132 (Participation in collaboration programs) + .13 (Conference attendance) - .012 (Teaching load) + .049 (Admin workload) + . 03 (Gender) + .07 (Martial statutes) - .012 (age) +. 269 (Academic rank) - .016 (Origin of the academic degree) + .087 (Citizenship).

Fifth model: Published edited and translated books. Results in Table 49 indicate that the model explained 14% of the variance in the number of published edited and translated books. A multiple correlation of .38 was obtained between the independent variable and the number of edited and translated books. Academic rank was found to be the only statistically significant predictor in the model to the dependent variable (beta = .13), which means higher ranked faculty had higher numbers of edited and translated books.

Table 49

Significant Correlates to Published Edited and Translated Books

Variables	Unstandardized coefficients B	Standardized coefficients Beta	Significance
Academic rank ß 28 AR	.122	.130	.042

R^2 = .144; R = .379a; F = 1.957 (p < .005); Durbin-Watson = 1.907.

No statistically significant relationships were found between the other independent variables and the response variable. Table 50 shows a summary of the tested hypotheses which proved statistically significant results at a 95% confidence level.

Table 50

Summary of Tested Hypotheses Proven Statistically Significant Results in Published Edited and Translated Books Model

Variables	Hypotheses	Testing results
Academic rank.	**H12:** Respondents reporting a higher academic rank will report a higher level of research productivity.	Results support the stated hypothesis.

The equation for this model is as follows:

y = β0 + β1 AE + β2IS - β3OS + β4 VS- β5CTD + β6 PRJ + β7 PS+ β8RF+β9 FI+ β10 RC + β11 EL+ β12 AF+ β13 CRT+ β14 RA+ β15 RF+ β16 SL + β17 AAL+ β18AC+ β19 AL+ β20 AETS + β21 CP + β22 CA+ β23 TL+ β24 AWL+ β25 G+ β26 MS+ β27 Age+ β 28AR+ β29OAD+ β30 C

y (Overall number of published edited and translated books)= .926 - .08 (academic environment) + .04 (Intellectual stimulation) + .013 (Working with opposite sex colleagues) + .091 (Visiting scholars programs) - .088 (Able to contribute to theoretical developments in discipline) - .089 (Publishing in referee journals) - .051 (Promotion system) + .069 (Administrative procedures for research funding) - .101 (Financial incentives for scientific publication) - .07 (Research centers) + .051 (Publish in English language) + .062 (Academic freedom level) + .076 (Course release time) - .133 (Research assistant) - .09 (Research funding) + .042 (Sabbatical Leave) - .185 (Access to academic library) -.109 (Access to computers) + .011 (Access to labs) + .148 (Academic editing and translating services) + .028 (Participation in collaboration programs) + .048 (Conference attendance) - .047 (Teaching load) + .003 (Admin workload) + . 029 (Gender) + .185 (Martial statutes) - .015 (Age) +. 122 (Academic rank) + .007 (Origin of the academic degree) + .168 (Citizenship).

Sixth model: Published book chapters. Table 51 shows that a multiple correlation of .37 was obtained between the significant independent variables and numbers of published book chapters. Five variables were found to be statistically significant correlates of the model indicating that 13% of the variance in faculty published book chapters can be explained by these

Table 51

Significant Correlates to Published Book Chapters

Variables	Unstandardized coefficients B	Standardized coefficients Beta	Significance
Faculty perception of research centers ß10 RC	-.176	-.152	.021
Faculty perception of the importance to access to academic library ß17 AAL	-.360	-.186	.007
Participation in collaboration programs ß21 CP	.127	.112	.04
Academic rank ß 28 AR	.162	.164	.023
Citizenship (tenure status) ß30 C	.212	.167	.003

R^2 = .134; R = .367a; F = 1.813 (p < .005); Durbin-Watson = 2.030.

correlates. Academic rank was found to be positively correlated with the response variable (beta = .16). Also, participation in collaboration programs was found positively related to the numbers of published book chapters. Citizenship (tenure status) was also found positively related to the dependent variable (beta = .17). The positive perception of the research centers and the higher perception of the importance of access to academic libraries were both negatively correlated to the number of published book chapters by a faculty member.

No statistically significant relationships were found between the other independent variables and the response variable. Table 52 shows a summary of the tested hypotheses which proved statistically significant results at a 95% confidence level.

The equation for this model is as follows:

y = β0 + β1 AE + β2IS - β3OS + β4 VS- β5CTD + β6 PRJ + β7 PS+ β8RF+β9 FI+ β10 RC + β11 EL+ β12 AF+ β13 CRT+ β14 RA+ β15 RF+ β16 SL + β17 AAL+ β18AC+ β19 AL+ β20 AETS + β21 CP + β22 CA+ β23 TL+ β24 AWL+ β25 G+ β26 MS+ β27 Age+ β 28AR+ β29OAD+ β30 C

y (Overall number of published book chapters)= - .473 + .005 (academic environment) - .068 (Intellectual stimulation) - .007 (Working with opposite sex colleagues) + .074 (Visiting scholars

programs) + .009 (Able to contribute to theoretical developments in discipline) + .001 (Publishing in referee journals) + .016 (Promotion system) + .084 (Administrative procedures for research funding) - .04 (Financial incentives for scientific publication) - .176 (Research centers) - .127 (Publish in English language) + .097 (Academic freedom level) + .042 (Course release time) - .043 (Research assistant) + .253 (Research funding) - .007 (Sabbatical Leave) - .36 (Access to academic library) + .078 (Access to computers) + .097 (Access to labs) + .099 (Academic editing and translating services) + .127 (Participation in collaboration programs) + .089 (Conference attendance) - .036 (Teaching load) + .008 (Admin workload) - . 021 (Gender) + .044 (Martial statutes) - .048 (age) +. 162 (Academic rank) - .005 (Origin of the academic degree) + .212 (Citizenship).

Table 52

Summary of Tested Hypotheses Proven Statistically Significant Results in Published Book Chapters Model

Variables	Hypotheses	Testing results
Perception of research centers (beta = .152).	**H4:** Respondents reporting a positive perception of the role of research centers will report a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Perception of the importance of the access to academic library (beta = .186).	**H5e:** Respondents reporting a higher perception of the importance of accessing academic library to conduct research will report a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Participation in collaboration programs (beta = .12).	**H6:** Respondents reporting a higher rate of participation in the collaboration programs will report a higher level of research productivity.	Results support the stated hypothesis.
Academic rank (beta = .14).	**H12:** Respondents reporting a higher academic rank will report a higher level of research productivity.	Results support the stated hypothesis.
Citizenship (tenure) (beta = .17).	**H13:** Tenured faculty will report a lower level of research productivity.	Results support the stated hypothesis.

Seventh model: Presented papers at conferences. Table 53 shows a multiple correlation of (R = .37) was obtained between the independent variables and the response variable. Three variables were found to be statistically significant correlates of the model indicating that 13% of the variance in the presented papers at conferences was explained by these correlates. Academic rank was again found to be the strongest correlate in the model (beta = .32), which means that higher ranked faculty had higher numbers of presented papers at conferences. Age was found again to have a negative relationship with the dependent variable (beta = -.14).

Table 53

Significant Correlates to Papers Presented at Conferences

Variables	Unstandardized coefficients B	Standardized coefficients Beta	Significance
Age ß27	-.225	-.137	.020
Academic rank ß 28 AR	.570	.318	.000
Origin of PhD degree ß29 OAD	.161	.137	.009

R^2 = .134; *R* = .367a; *F* = 1.813 ($p < .005$); Durbin-Watson = 2.030.

This means that older faculty showed a decrease in the number of papers presented at conferences. Origin of PhD degree was found to have a positive relationship with the numbers of papers presented in the conferences (beta = .13). No other significant relationships were found between the rest of the independent variables and the response variable in this model. Table 54 shows a summary of the tested hypotheses which proved statistically significant results at a 95% confidence level.

Table 54

Summary of Tested Hypotheses Proven Statistically Significant Results in Papers Presented at Conferences Model

Variables	Hypotheses	Testing results
Age (beta = .14)	**H10:** Older respondents have a higher level of research productivity.	Results do not support the stated hypothesis. Alternative hypothesis must be proposed.
Academic rank (beta = .32).	**H12:** Respondents reporting a higher academic rank will report a higher level of research productivity.	Results support the stated hypothesis.
Origin of PhD degree (beta = .14)	**H14:** Respondents holding PhD degrees from Saudi universities will report a lower level of research productivity.	Results support the stated hypothesis.

The equation for this model is as follows:

$$y = \beta 0 + \beta 1\ AE + \beta 2IS - \beta 3OS + \beta 4\ VS - \beta 5CTD + \beta 6\ PRJ + \beta 7\ PS + \beta 8RF + \beta 9\ FI + \beta 10\ RC + \beta 11\ EL + \beta 12\ AF + \beta 13\ CRT + \beta 14\ RA + \beta 15\ RF + \beta 16\ SL + \beta 17\ AAL + \beta 18AC + \beta 19\ AL + \beta 20\ AETS + \beta 21\ CP + \beta 22\ CA + \beta 23\ TL + \beta 24\ AWL + \beta 25\ G + \beta 26\ MS + \beta 27\ Age + \beta\ 28AR + \beta 29OAD + \beta 30\ C$$

y (Overall number of papers presented in scientific conferences)= .89 + .034 (academic environment) + .08 (Intellectual stimulation) - .044 (Working with opposite sex colleagues) + .084 (Visiting scholars programs) + .001 (Able to contribute to theoretical developments in discipline) + .051 (Publishing in referee journals) + .125 (Promotion system) - .173 (Administrative procedures for research funding) - .079 (Financial incentives for scientific publication) - .099 (Research centers) - .021 (Publish in English language) + .053 (Academic freedom level) - .061 (Course release time) - .017 (Research assistant) + .135 (Research funding) - .155 (Sabbatical Leave) + .13 (Access to academic library) + .051 (Access to computers) - .032 (Access to labs) - .074 (Academic editing and translating services) + .141 (Participation in collaboration programs) + .306 (Conference attendance) - .119 (Teaching load) + .04 (Admin workload) - . 169 (Gender) - .245 (Martial statutes) - .225 (Age) + . 57 (Academic rank) + .161 (Origin of the academic degree) + .21 (Citizenship).

Summary

This chapter aimed at understanding the variation in faculty scholarly performance by exploring the relationship between a cluster of independent variables and faculty research

productivity. The chapter underlined the main descriptive findings of the survey, discussed the results of the multiple regression analysis, and the analysis of means to determine the differences among groups.

As shown in Table 55, seven regression models were run to explore the correlation between the independent and dependent variables. All seven models were found statistically significant. Several research-promoting practices were found to have significant relationships with faculty research productivity. First, faculty's perception of collegial atmosphere and exchange of ideas at the universities was found to be positively related to numbers of

Table 55

Summary of the Multiple Regression Models

Dependent variables models	R	R square	Adjusted R square	Significance
Model 1. Overall research productivity***	.598a	.358	.303	.000b
Model 2. Publications in refereed journals***	.605a	.366	.312	.000b
Model 3. Publications in professional journals***	.436a	.190	.121	.000b
Model 4. Published books***	.454a	.206	.138	.000b
Model 5. Edited and translated books**	379a	.144	.070	.002b
Model 6. Published book chapters**	.367a	.134	.060	.007b
Model 7. Papers presented at conferences***	.475a	.225	.159	.000b

publications in refereed and professional journals. A negative relationship was found between faculty's perception of the financial incentives for scientific publication and number of publications in refereed journals. Also, negative relationships were found between faculty's perception of the role of research centers in supporting research projects and (a) faculty overall research productivity, (b) number of published books, and (c) numbers of published book chapters. No relationship was found between faculty's perception of the academic promotion potential and faculty research productivity.

Second, research support services had both negative and positive correlation with faculty research productivity. Faculty's higher perception of the importance of academic editing and translating services revealed a negative relationship with publication in refereed journals, and a positive relationship with numbers of published books. Faculty's higher perception of the importance of the access to academic libraries had also a negative relationship with the number of published book chapters. No other significant relationship was found between faculty's perception of research support services and faculty research productivity.

Third, participation in collaboration programs was found to have positive relationships with (a) faculty overall research productivity, (b) number of published books, and (c) numbers of published book chapters. Fourth, conference attendance was found to have positive relationships with (a) faculty overall research productivity, (b) number of publications in professional journals, and (c) number of published books. No significant relationship was found between teaching and administrative workload and faculty research productivity.

In terms of personal characteristics, academic rank was found to have the strongest and highest correlation with faculty research productivity in all seven regression models. Full professors had the highest levels of research productivity compared to associate and assistant professors. Age was found to have a negative correlation with (a) faculty overall research productivity, (b) number of publications in professional journals, and (c) numbers of presented papers at scientific conferences. However, ANOVA tests revealed that older faculty had the highest number of publications in the refereed journals. Citizenship (tenure status) had a significant correlation with the number of publications in professional journals, as well the number of published book chapters. The overall research productivity of tenured faculty was lower than nontenured faculty; they also published fewer articles in professional journals and

book chapters. Origin of PhD degree was found to be positively correlated to the number of presented papers at conferences. Professors who graduated from Saudi universities showed lower overall research productivity, had fewer publications in refereed and professional journals, and had lower numbers of presented papers at conferences. Male faculty were found to have a significantly higher number of publications in refereed journals compared to female faculty. No relationship was found between marital status and faculty research productivity.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this chapter is to summarize the study and state its main findings and conclusions. Policy implications are presented and discussed, in addition to recommendations for future research, at the end of chapter.

Overview of the Study

The purpose of this study was to explore which factors relate to faculty research outcomes at Saudi Arabian public universities. The relationship between practices supporting research at the university and faculty research productivity were explored and discussed from the perspective of human capital investment to address the major research question: How do research-promoting practices at Saudi public universities contribute to high levels of faculty research productivity?

The population of this study were all faculty members holding a doctoral degree at the following universities:

- King Saud University
- King Abdul Aziz University
- King Khalid University
- King Faisal University

A survey research design was used to collect data from faculty members working in these universities. Participants were recruited via e-mail at their institutional e-mail addresses and were

invited to complete an anonymous online questionnaire. Research productivity was measured using seven measurements: publications in refereed journals, publications in professional journals, published books, edited and translated books, book chapters, papers presented at conferences, and overall research productivity. The following two blocks of independent variables were used in the study:

First block: Research-promoting practices refers to the practices carried out by the university to promote research productivity among faculty members. Five variables were used to measure this construct.

1. Supportive collegial environment and research climate which was operationalized using the following subvariables:

- Perception of the collegial atmosphere and exchanging of ideas.
- Perception of publication support.
- Perception of promotion potential.
- Perception of the role of research centers.

2. Research support services in the university, which was operationalized using the following subvariables:

- Perception of the importance of the course release time
- Perception of the importance of research assistant.
- Perception of the importance of research funding.
- Perception of the importance of sabbatical leave.
- Perception of the importance of access to academic library.
- Perception of the importance of access to computers.
- Perception of the importance of access to labs.

- Perception of the importance of academic translation and editing services.

3. Participation in collaboration programs.

4. Conferences attendance.

5. Teaching and administrative workload.

Second block: Personal characteristics refer to the following variables: gender, age, martial statues, academic rank, citizenship (tenure status), and origin of PhD degree.

Faculty research productivity was the dependent variable in this study. The following types of research activities were used to measure faculty research productivity:

1. Overall research productivity.

2. Published articles in refereed journals.

3. Published articles in professional journals.

4. Published books.

5. Published book chapters.

6. Edited and translated books.

7. Presented papers at conferences.

The study hypotheses were tested for each one of these seven measurements separately. Table 56 shows the results of the tested hypotheses for each of these measurements. The columns in the table are numbered after the above listed measurements.

Summary

The distinction between this study and other studies examining faculty research productivity is the attempt to explore it from the perspective of human capital theory. The study proposed that the practices carried out by a university to promote research productivity among its faculty members, is in fact an embedded investment in the human capital of its faculty. This

Table 56

Summary of Tested Hypotheses

Hypotheses	Measurements of research productivity 1	2	3	4	5	6	7
H1a: Respondents reporting a positive perception of their academic atmosphere will report a higher level of research productivity.		x					
H1b: Respondents reporting a positive perception of intellectual stimulation in daily contacts with colleagues will report a higher level of research productivity.			x				
H1c: Respondents reporting a positive perception working with the opposite sex colleagues will report a higher level of research productivity.							
H1d: Respondents reporting a positive perception of visiting scholar programs will report a higher level of research productivity.							
H1e: Respondents reporting a positive perception of academic freedom will report a higher level of research productivity.							
H2a: Respondents reporting a positive perception of university support to publication in refereed journals will report a higher level of research productivity.							
H2b: Respondents reporting a positive perception of the financial incentives for research will report a higher level of research productivity.		*					
H2c: Respondents reporting a positive perception of support to conduct research in English will report a higher level of research productivity.							
H2d: Respondents reporting a positive perception of the research funding process will report a higher level of research productivity.				x			
H3: Respondents reporting a positive perception of promotion potential will report a higher level of research productivity.							
H4: Respondents reporting a positive perception of the role of research centers will report a higher level of research productivity.	**			**	**		
H5a: Respondents reporting a higher perception of the importance of the course release time to conduct research will report a higher level of research productivity.							
H5b: Respondents reporting a higher perception of the importance of the research assistant to conduct research will report a higher level of research productivity.							
H5c: Respondents reporting a higher perception of the importance of research funding to conduct research will report a higher level of research productivity.							
H5d: Respondents reporting a higher perception of the importance of the sabbatical leave to conduct research will report a higher level of research productivity.							

Table 56 - continued

Hypotheses	Measurements of research productivity 1	2	3	4	5	6	7
H5e: Respondents reporting a higher perception of the importance of accessing an academic library to conduct research will report a higher level of research productivity.					***		
H5f: Respondents reporting a higher perception of the importance of accessing computers to conduct research will report a higher level of research productivity.							
H5g: Respondents reporting a higher perception of the importance of accessing labs to conduct research will report a higher level of research productivity.							
H5h: Respondents reporting a higher perception of the importance of academic translation and editing services to conduct research will report a higher level of research productivity.		****		x			
H6: Respondents reporting a higher rate of participation in collaboration programs will report a higher level of research productivity.	x			x	x		
H7: Respondents reporting a higher number of conferences attendance will report a higher level of research productivity.	x		x	x			
H8a: Respondents reporting higher teaching hours will report a will report lower level of research productivity.							
H8b: Respondents reporting higher administrative working hours will report a lower level of research productivity.							
H9: Male respondents have a higher level of research productivity		x					
H10: Older respondents have a higher level of research productivity.	*****	x	*****				*****
H11: Married respondents have a lower level of research productivity.							
H12: Respondents reporting a higher academic rank will report a higher level of research productivity.	x	x	x	x	x	x	x
H13: Tenured faculty will report a lower level of research productivity.	x		x		x		
H14: Respondents holding PhD degrees from Saudi universities will report a lower level of research productivity.	x	x	x				x

* Research financial incentives had a significant reverse relationship with the numbers of publications in refereed journals.

** Research centers had a significant reverse relationships with; faculty overall research productivity, numbers of published books and book chapter.

*** Access to academic library has a significant reverse relationship with the numbers of published book chapters.

**** Translating and editing services had a significant reverse relationship found with publications in refereed journals.

***** Faculty's age had significant reverse relationships with; overall research productivity, publications in professional journals. and papers presented at conferences

notion was discussed by Middlehurst (2007), who argued that there are good reasons for investing in a university's human capital by implanting a range of practices including training and support. Middlehurst (2007) also pointed out that, outside universities, there is already a body of research that provides evidence of the positive relationship between investing in human capital using specific management practices and organisational performance. However, exploring such investment is still relatively rare in the higher education context. Therefore, this study adds to the body of literature about faculty research productivity by discussing it from the perspective of human capital investment. This study made a case that, assuming a faculty has the required training and competencies to conduct scholarly work, practices that are promoting and strengthening research outcome on the part of the faculty members at a university are related to the level of faculty scholarly productivity, and that these practices are associated with the university's investment in its human capital. In addition, the study explored the relationship between faculty personal characteristics and their research productivity.

Theoretical Framework

The study used the theory of human capital investment to frame its conceptual approach. Human capital theory posits that the investment in the individual's knowledge, skills, and health using education and training strategies is related to his/her income, productivity, and performance (Becker, 1964; Schultz, 1961). In the organizational context, investment in human capital can be implemented by using certain organizational strategies and practices to direct the human capital (manpower) to benefit the organization's competitive advantages (Coff, 1997; Wright & Nishii, 2007). Previous literature has repeatedly asserted that organizations should use a collection of practices to attract, retain, and motivate employees (Wright & Boswell, 2002). Similarly, extensive research suggested that there is an association between the use of human

resources management best practices and firm performance (Alexopoulos & Monk, 2004; Boon, Den Hartog, Boselie, & Paauwe, 2011; Goodall et al., 2014; Harney et al., 2014; Huselid, 1995; Jang-Ho & Khan-Pyo, 2013; Perry, 1991; Pfeffer, 1994; Van der Weijden et al., 2008). In higher education context, McCormack et al. (2013) used a tried and tested measure of management practices to predict performance across 100+ U.K. universities and found management practices, particularly with respect to provision of incentives for staff and recruitment, are correlated with both teaching and research performance conditional on available resources and past performance.

The premise of this study was that research-promoting practices at four Saudi public universities are related to their faculty research productivity. And that, carrying out these practices is an embedded investment, made by these universities, in the human capital of their faculty members. The practices that were used to explore faculty research productivity in these universities are:

- Supportive collegial environment and research climate.
- Research support services.
- Participation in collaboration program.
- Conference attendance.
- Teaching and administrative workload.

Major Findings

Research-Promoting Practices and Faculty Research Productivity

Supportive collegial environment and research climate practices. Four subvariables were used to investigate the relationship between this independent variable and faculty research productivity, fostering collegial atmosphere and exchange of ideas, publication support, promotion potential, and the role of research centers. These subvariables were found partially

significant correlates to faculty research productivity. The following are the major findings from the regression analysis results.

In terms of the practices fostering collegial atmosphere and exchange of ideas, the current academic environment that stimulates colleagues to collaborate in research was found positively correlated to faculty's publications in refereed journals (beta = .23). The positive perception of the intellectual stimulation made in the daily contacts among colleagues was also positively correlated to faculty's publication in the professional journals (beta = .14). These findings assert the importance of collegial inclusion and a cooperative interaction environment inside Saudi public universities and their positive impact on faculty research productivity, particularly publications in refereed and professional journals. This is consistent with the findings from several studies that suggested faculty members revealed a better performance at universities adopting comparatively more positive academic environments (Freedman, 2012; Moran & Volkwein, 1988). Rakes and Rakes (1997) argued that when faculty members support, trust, respect, encourage one another, and choose to work together, professional opportunities for growth and improvement are created and collaboration among them leads to shared planning and productivity. Therefore, it is necessary for Saudi public universities to develop a campus culture that values collegiality and respect in which faculty members can work together and interact in a professional manner. This will encourage colleagues to communicate and share ideas which can drive greater performance and creativity at the university.

In terms of publication support practices, the positive perception of the administrative procedures to request research funding was found to be positively related to the number of books published by a faculty (beta = .16). This indicates that the current procedures to request research funding as perceived by faculty at Saudi public universities is important to increase faculty

research productivity. The recent increases in governmental funding for research, that now comprises 1.1% of the national domestic product (Smith & Abouammoh, 2013), should be accompanied with an improvement in the current process of requesting research funding. To positively impact faculty research productivity, this process should be efficient, accountable, competitive, and with less bureaucratic red tape.

An unanticipated negative relationship was found between faculty's perception of the financial incentives that aim to promote publication productivity and the numbers of articles a faculty member publishes in refereed journals (with beta = - .14). This means that the positive perception of financial incentives for publication correlated to a decrease in the numbers of the published articles in refereed journals, if all the other variables are held constant. A possible explanation for this result is that a faculty member's favor of financial reward doesn't actually motivate him/her to conduct research. The motivation for publication can be driven by other motives such as academic promotion or self-efficacy. Rebne (1988) argued that the faculty member's moral attachment to research implies that his/her effort will not change in response to financial rewards. Similarly, Harris and Kaine (1994) pointed out that research performance is not influenced by "lower-order" needs such as financial rewards. So, it is the faculty member's inner motivation that drives him/her to engage in research work with a sheer love of the work rather than being influenced by financial incentive (Bland & Ruffin, 1992; Chen et al., 2006; Colbeck, 1992; Hardré, 2012). Therefore, the current practice of providing financial rewards to promote research performance at Saudi public universities needs to be reconsidered and evaluated by the universities' leaders to explore its effectiveness in achieving its goal of motivating faculty members to conduct scholarly work. Also, future research work with

longitudinal data on faculty attachment to research work is needed to explore further possible alternative incentives to reward and promote outstanding faculty research performance.

In terms of the role of research centers, the results revealed significant and negative relationships between faculty's perception of the role of the research centers in supporting research projects and faculty overall research productivity (beta = -.12), the number of books published by faculty (beta = -.17), and the number of book chapters published by faculty (beta = -.15). This means that the positive perception of the role of the research center in the university is correlated with a decrease in faculty overall research productivity and the numbers of books and book chapters they published. This finding opposed the expected positive impact of research centers which are established to house faculty research training and to provide them with research support. This result suggested that research centers in Saudi public universities may not play an effective role in supporting faculty scholarly work. A reason behind that can be what Alshayea (2013) found in his analysis of the status of scientific research in Saudi Arabia that research centers in universities suffer from the predominance of bureaucratic regulations that limit their role in supporting the production of research work. Similarly, McPhedran (2013) argued that Saudi public universities support research centers instead of supporting individual researchers or research teams via competitive grants, which leads to spending a huge portion of the centers' budgets on the administrative and operating expenses and employees' salaries. Therefore, a thorough assessment of research centers' performance should be conducted to obtain useful data about their outcomes. This can help in identifying the factors that aid or impede their achievement of results.

Providing research support services. The relationship between faculty research productivity and the perception of the importance of the following research support services

were explored: course release time, availability of research assistance, sabbatical leave, research funding, access to academic libraries, access to computers, access to labs, providing editing and translating services. Among these support services, providing academic editing and translating services was found to be negatively related to the number of publications in refereed journals (beta = -.13), and positively related with the number of books published by faculty (beta = .17). This finding was corroborated by Garcia Cepero (2007), who asserted the importance of establishing support systems for research and writing in the university to provide services such as consultation with research associates, literature search, editing and manuscript preparation, and data transcription. Academic translation and editing in Saudi public universities is necessary as English language is the second language for the majority of faculty members; however, it is considered the main language of science and academic publication (Ashoor & Chaudhry, 1993). This creates challenges for faculty who are not native speakers of English in terms of publishing in reputable refereed journals. Drubin and Kellogg (2012) argued that a common complaint of faculty members, who are non-native speakers of English, is that manuscript reviewers at peer review journals often focus on criticizing non-native English speakers' faulty English language, rather than looking beyond the language to evaluate the scientific results and logic of their manuscripts. And that makes it difficult for their manuscripts to get a fair review, and ultimately, to be accepted for publication. Therefore, establishing translation and editing units at Saudi public universities can help to develop faculty writing for publication, and enhance their opportunity to have their research work accepted for publication in refereed journals.

Participation in collaboration programs. Table 57 shows that faculty participation in collaboration programs was positively related to faculty overall research productivity (beta = .11), and the number of books and book chapters published by a faculty (beta =. 13) and (beta =

Table 57

Summary of the Significant Research-Promoting Practices in All Regression Models

Dependent variables	Significant independent variables	Sig.	Beta
1. Overall research productivity.	Perception of research centers in the university.	.036	-.12
	Participation in collaboration programs.	.022	.108
	Conference attendance.	.000	.169
2. Published articles in refereed journals.	Perception of the academic environment.	.000	.232
	Perception of the financial incentives for scientific publication.	.018	-.14
	Perception of the importance of academic editing and translating services.	.008	-.13
3. Published articles in professional journals.	Perception of intellectual stimulation	.025	.140
	Conference attendance.	.049	.104
4. Published books.	Perception of the administrative procedures for research funding	.018	.162
	Perception of research centers	.006	-.17
	Perception of the importance of academic editing and translating services	.002	.173
	Participation in collaboration programs	.013	.131
	Conference attendance	.003	.153
5. Published edited and translated books.	None	-	
6. Published book chapters.	Perception of research centers	.021	-.15
	Perception of importance of academic library	.007	-.19
	Participation in collaboration programs	.04	.112
7. Papers presented at conferences.	None	-	

.11). This means that participation in collaboration programs is important to faculty research productivity. Similar findings were found in previous studies that asserted the importance of developing research collaboration and networking opportunities to improve faculty's research skills and efficacy (Freshwater, Sherwood, & Drury, 2006; Lee & Bozeman, 2005; Rush & Wheeler, 2011). Therefore, it is important to increase the opportunities for faculty members,

particularly junior faculty, to participate in national and international academic collaboration programs to improve their research performance.

Conference attendance. The rate of conference attendances was found positively related to faculty overall research productivity (beta = .17), the numbers of faculty publications in professional journals (beta= .10), and the numbers of books published by faculty (beta = .15). These finding were consistent with the findings from several studies that found conferences attendance is an important correlate to faculty's publication productivity (Gregorutti, 2008; Rush & Wheeler, 2011; Teodorescu, 1995). Increasing the opportunities for faculty to attend conferences can assist them in building confidence and an academic network that would encourage them to engage more in research work.

Teaching and administrative workload. Interestingly, there was no significant relationship found between faculty research output and their teaching and administrative workload (see Appendix B). However, Hassna and Raza (2011) had a similar finding when they explored the relationship between the three components of the academic profession at Qatar University and found no significant relationship between the scholarly endeavor and either teaching or service performance. Further research is needed to investigate thoroughly the impact of a faculty workload on his/ her research productivity.

Personal Characteristics and Faculty Research Productivity

The empirical evidence in the study indicated that academic rank was found to be the strongest significant correlate of faculty research productivity at Saudi public universities. This finding is consistent with the results from previous studies that found academic rank strongly related to research productivity (Aleamoni & Yimer, 1987; Hardré et al., 2011). ANOVA tests revealed that full professors were predominantly higher in research productivity than associate

and assistant professors. Over 65% of the tenured faculty (Saudis) were full professors compared to 35% non-tenured faculty. However, differences between associate and full professors were not all statistically significant. Similar results were proposed by Tien and Blackburn (1996) in their analysis of the relationship between faculty ranking system and faculty research productivity, which revealed that full professors had the highest research productivity level compared to the other academic ranked faculty. One explanation for this finding is what Green (1998) proposed that the number of manuscripts accepted for publication is higher for the higher ranked faculty compared to the lower rank faculty. Another explanation for the higher productivity by full professors at Saudi universities can be explained by what Tien and Blackburn (1996) suggested that publication rates are usually influenced by the timing of promotion, as faculty members would publish more when the timing of the promotion approaches. These findings suggest that, because full professors revealed the highest level of research outcomes, they should be recognized as the pool of human capital in the university and the source of its competitive advantage. Therefore, it is important to design human resource strategies and policies that target the retention of full professors. In addition, it is important to utilizing their research skills and experiences to train and mentor junior faculty in order to improve their research performance. Age regression analysis revealed that an increase in faculty's age is correlated with a decrease in faculty overall research productivity (beta = - .15), the numbers of publications in professional journals (beta= - .18), and numbers of papers presented at conferences (beta=-.14). This means that older faculty members showed a decrease in their overall productivity. Over 71% of the tenured faculty aged 51 and older compared to 29% nontenured faculty. This can be explained by the notion that when senior faculty reach their retirement age, their productivity slows down. The decline in research outcome was found in several studies to be correlated to older faculty

(Diamond, 1985; Teodorescu, 2000). Interestingly, the results of the analysis of means among age groups revealed that older faculty had the highest number of publications in refereed journals compared to the other age groups. The positive correlation between faculty members' age and their accumulative professional experience (Gingras, Lariviere, Macaluso, & Robitaille, 2008; Nathans, Oswald, & Nimon, 2012) can explain the increase in the numbers of their publications in refereed journals in particular (see Table 58). Also, older professors who have more research experience usually have better chances to have their research work accepted for publication compared to junior faculty members who might be prolific in conducting research but have lower chances of having their papers accepted for publication due to their short research experience. Therefore, designing a faculty mentoring program to facilitate the professional development of junior faculty members in Saudi public universities by matching them with experienced senior faculty members can provide junior faculty members with a close and interpersonally supportive professional relationship that can improve their research performance.

In terms of citizenship (tenure status), the results of the regression analysis revealed that statistically significant correlations were found between the faculty members' country of citizenship (tenure status) and the number of their publications in professional journals (beta = .15), and the number of book chapters they published (beta =. 17). The results of ANOVA tests indicated that Saudi faculty published fewer scholarly works compared to nontenured faculty members. Considering that tenured faculty were the majority in the sample (66%), the low level of their publications compared to nontenured faculty is noteworthy. An explanation for such differences is that the Saudi Arabian civic laws grant Saudi faculty immediate tenure—with little possibility of losing it for poor performance—and tying their salary increase to the length of service and rank rather than to performance (Altbach, 2014). On the other hand, foreign

Table 58

Summary of the Significant Personal Characteristics Correlated to Faculty Research Productivity

Dependent variables	Significant independent variables
Overall research productivity	Gender (male)* Age** Tenure status (Saudis)*** Origin of PhD degree (graduated from Saudi universities)**** Academic rank*****
Published articles in refereed journals	Gender (male)* Age (older faculty publish more) Origin of PhD degree (graduated from Saudi universities)**** Academic rank*****
Published articles in professional journals	Age** Tenure status (Saudis)*** Origin of PhD degree (graduated from Saudi universities)**** Academic rank*****
Published books	Tenure status (Saudis)*** Academic rank*****
Published edited and translated books	Academic rank*****
Published book chapters	Tenure status (Saudis)*** Academic rank*****
Papers presented in conferences	Age** Origin of PhD degree (graduated from Saudi universities)**** Academic rank*****

*Male published more than female faculty. **Older faculty members published less. ***Tenured faculty (Saudis) published less. ****Faculty graduated from Saudi universities published less. *****Higher academic ranked faculty published more.

academics, who make up 42% of the total workforce in Saudi Arabian public universities, are appointed on renewable term contracts without a chance of obtaining tenured posts or long-term contracts (Altbach, 2014). Moreover, the incentives for non-Saudi professors to perform

adequately are high, because they want to have their contracts renewed (Altbach, 2014). A review of the current structure of the academic appointment system at Saudi universities is necessary in order to identify possible reform of the civic laws in terms of appointment and type of employment contracts granted to faculty members. Such reform can offer the academic profession at Saudi public universities the potential for excellence.

The origin of PhD degrees was found to be significantly correlated to the number of papers presented at scientific conferences (beta = .14). The results of ANOVA tests revealed that graduates from a Saudi university had a lower level of research productivity compared to other faculty members. Generally, the research training offered to PhD students at Western universities is stronger and of higher standards compared to the doctoral training offered at the other countries. Moreover, several PhD programs at Saudi universities were taught in Arabic language, so that faculty members graduating from these programs had lower research performance due to their weak proficiency in English. Therefore, maintaining the current practice in providing overseas scholarships to a high numbers of Saudi graduate students in top-tier schools would lead to a future improvement in the research performance at Saudi universities.

In terms of gender, *t*-tests revealed that male faculty generally had a higher level of productivity. There was a significant difference between male and female faculty in terms of the number of publications in refereed journals, as male faculty were found to publish more articles in refereed journals (M = 2.72) than female faculty (M = 2.22). Findings from previous literature mainly suggested that male faculty publish more than female faculty due to family and childcare responsibilities (Blackburn & Lawrence, 1995; Garcia Cepero, 2007; Prpić, 2002). However, the gender gap in research productivity has declined in the last few decades (Sax et al, 2001). The

publication gap between male and female faculty in Saudi public universities might be influenced by organizational factors. For example; the current strict gender segregation that exists at Saudi universities led to an absence of women presence in the decision making positions. In addition, networking or professionally meeting with colleagues or visiting scholars and researchers from opposite genders in person is difficult which could hinder female faculty from engaging in research activities. However, many initiatives can contributor to the improvement in female faculty's research skills:

- The increasing numbers of sponsored female students by the national scholarship programs to study at international universities.
- The increasing opportunities granted to female faculty to attend international conferences and workshops.
- The increasing opportunities for female faculty members to participate in collaboration programs inside and outside the university had led to an enhancement in their research skills and academic networking, which in turn has impacted their academic and research performance.

Moreover, it is necessary to engage female faculty in the strategic planning process at the universities. It is also important to allow for direct discussion between male and female faculty across the university about the issues related to research projects (Jamjoom & Kelly, 2013). Marital status was not found to be significantly associated with a higher level of productivity for any type of faculty research productivity. Similar finding was found by Sax et al. (2002) who explored the role of several family-related factors and found little or no effects of marital status on research productivity.

Implications for Higher Education Policy

This study explored the relationship between research-promoting practices in a Saudi public university and the level of faculty research productivity. The results of this study revealed that the practices explored in this study were not all strongly associated with faculty research productivity, which indicates that some of these practices need to be investigated and assessed by decision makers in Saudi higher education in order to make necessary changes in the policies and strategies related to these practices.

The findings of this study underlined several aspects of importance to the leaders at these universities. First, the findings draw attention to the importance of academic networking and engagement within a larger pool of experienced researchers and academicians. Therefore, an initiative by higher education is required to establish a strong professional network inside and across Saudi public universities to allow for a wider communication and exchange of ideas among faculty. This can support shared research projects among faculty from different disciplines through collaboration and mentorship programs. Moreover, establishing professional networks with international universities and scholars in an incremental process that serves the objectives of Saudi public universities can leverage the quality of the research work through collaborative programs and joint authorship of international papers as Smith and Abouammoh (2013) suggested. Also, to enhance the opportunity for more academic networking, Saudi universities can increase faculty attendance at international and national academic conferences, whether or not they have papers or research reports to be presented. This can keep them updated in their fields of expertise and constantly communicate with the academic community.

Second, the negative relationship found between the perceived role of research centers and level of research productivity underlined the importance of initiating a thorough assessment

of the performance of these centers to collect data and propose recommendations for improvement based on the results of the assessment. This initiative can be conducted by a team from the Centre for Higher Education Research and Studies, an independent research unit within the Ministry of Higher Education, to review the programs and processes carried out by these centers, and to audit their outcomes. Moreover, the study results suggest that establishing editing and translating units at Saudi public universities is necessary to improve the quality of faculty research work and to foster opportunities to have their research work accepted for publication. Establishing a physical place for these units at the research centers can be an added value to the role of the centers and a way to attract faculty to conduct research.

Third, academic rank was found to be the strongest correlate to faculty research productivity. Full professors were found to have the highest level of research productivity in Saudi public universities. Therefore, it is necessary to develop a strategy that targets the retention of higher ranked faculty. This can be implemented by developing certain human resource practices and a reward system that targets meeting the expectations of professors (Kim, 2003). Moreover, the cumulative experiences and research skills the full professors have can be utilized through developing mentorship programs that aim to improve the research performance of junior faculty by matching them with a full professor who shares similar research interests.

Fourth, the differences in the level of research productivity found between Saudi (tenured) and non-Saudi faculty (nontenure track) suggested the necessity to address the current academic appointment system as being related to faculty research outcomes. The level of job security offered to Saudi faculty might negatively motivate them to conduct research work. Therefore, reforming the terms of faculty appointment is needed. Tenure positions should be

fairly granted to all faculty members based on their overall performance rather than their citizenship.

Study Limitations

- This study was limited to the faculty working in four comprehensive and doctoral granting public universities. However, some results can be generalized to other public universities as Saudi public universities implement similar policies and regulations that are set by the MOHE.
- This study is cross-sectional and provides a description of the current phenomenon; therefore its ability to make a causal claim is limited (Tien & Blackburn, 1996). This study tested a correlation not a causation relationship among variables.
- The nonprobability sampling method used in this study focused on particular characteristics of the population that were of interest to answer the research question. However, the results cannot be generalized as the sample being studied is not representative of the population.
- A well-developed online survey tool was used to design the Web-based survey questionnaire; however, higher education institutions that maintain high security and intense spam blockers may block e-mail from certain websites, so many subjects of the target population may not have received the online survey, which may cause a nonresponse bias.

Recommendations for Further Research

This study has offered an insight into the practices related to research productivity of faculty members at four Saudi Arabian public universities. However, this study raised issues and questions that require further investigation in future research.

First, the sample in this study is that of all PhD-holder faculty who work at the top four research universities. Therefore, it is necessary to conduct a future research study that includes faculty members from other universities using probability sampling to provide generalizable information about research productivity in Saudi universities.

Second, this study is a quantitative one that used a survey technique to collect the data because the aim of the study was to gain some general understanding of the correlates to faculty research productivity at Saudi public universities. However, a future focused study using time-intensive methods such as in-depth interviews or field research will provide better information. Moreover, a future study can use a combination of survey method and an in-depth interview method to provide valuable information and deeper understanding of the factors impacting the level of faculty research productivity in a larger sample of Saudi public universities.

Third, previous studies suggested that academic disciplines are related to faculty research productivity; however, this relationship was not investigated in this study. Therefore, exploring the variance in faculty members' research productivity across disciplines would provide useful information about the research productivity in certain disciplines (i.e., STEM) at Saudi public universities.

Fourth, exploring the impact of the current bureaucratic and administrative structures on the productivity of the academicians in Saudi private universities is needed. In particular, future studies need to investigate if the civil service bylaws governing academic appointments in the universities have an influence on faculty overall performance and productivity. Also conducting benchmarking studies of regional universities can provide information on academic appointment best practices.

REFERENCES

REFERENCES

Ab Aziz, K., Harris, H., Richardson, S., & Ab Aziz, N. A. (2012). Drivers for university research performance: Investigating the researchers' dynamics. *IBIMA Business Review*, 2012, 1-16. Retrieved from http://search.proquest.com/docview/1446314468?accountid=14780

Abel, J. R., & Deitz, R. (2012). Do colleges and universities increase their region's human capital? *Journal of Economic Geography, 12*(3), 667-691.

Abramo, G., D'Angelo, C. A., & Di Costa, F. (2011). Research productivity: Are higher academic ranks more productive than lower ones? *Scientometrics, 88*(3), 915-928.

Ahmad, R. (2012, November). Significance of human capital for economic growth. *British Journal of Humanities and Social Sciences*, *7*(2), 81-86.

Alabdulataif, J. (2008). *Moawigat albahth alalmi alti twajeh ada haiat altadres* (Descriptive study at KSU & IMU). Funded study by School of Literature at King Saud University

Al-Abduljabbar, A. (2013). *Incentives of scientific research in the university community from faculty point of view.* Proceedings of the 2013 WEI International Academic Conference, Istanbul, Turkey

Al-Asmari, A. M. (2005). *The use of the Internet among EFL teachers at the colleges of technology in Saudi Arabia* (Doctoral dissertation). Ohio State University, Columbus.

Al-Bishri, J. (2013). Evaluation of biomedical research in Saudi Arabia. *Saudi Medical Journal*, *34*(9), 954-959.

Aleamoni, L. M., & Yimer, M. (1973). An investigation of the relationship between colleague rating, student rating, research productivity, and academic rank in rating instructional effectiveness. *Journal of Educational Psychology, 64*(3), 274.

Al-Eisa, E. S., & Smith, L. (2013). Governance in Saudi higher education. In L. Smith & A. Abouammoh (Eds.), *Higher education in Saudi Arabia* (pp. 27-35). Springer Netherlands.

Aleissa, I. M. (1989). The political economy of Saudi Arabia: investment in human capital and the economics of higher education (Doctoral dissertation). University of Denver. Available from ProQuest Dissertations Publishing.

Alexopoulos, A., & Monks, K. (2004). *A social capital perspective on the role of human resource practices in intra-organisational knowledge sharing* (Working paper). Retrieved from http://www.dcu.ie/dcubs/crmld/working_papers/hrd.pdf

Al-Ghamdi, A. (2002). *Factors associated with research and publication productivity of library and information studies' faculty in Saudi Arabian universities*. Available from ProQuest Dissertations and Theses database. (UMI No. 305591047)

Al-Ghamdi, S., & Tight, M. (2013). Selecting and developing high-quality academic staff. In L. Smith & A. Abouammoh (Eds.), *Higher education in Saudi Arabia* (pp. 83-93). Springer Netherlands.

Al-Gindan, Y. M., Al-Sulaiman, A. A., Muhanna, F. A., & Abumadini, M. S. (2002). Research and research activities in a university in eastern Saudi Arabia. *Saudi Med Journal, 23*(11).

Alghanim, S. A., & Alhamali, R. M. (2011, December). Research productivity among faculty members at medical and health schools in Saudi Arabia. *Saudi Med Journal, 32*(12), 1297-1303.

Ali, M., Bridging knowledge divides: Internet-based academic research in Saudi Arabia (2006). *ECIS 2006 Proceedings*. Paper 181. Retrieved from http://aisel.aisnet.org/ecis2006/181

Alli, A. L. R. (2002). *The effects of academic origin and academic affiliation on research productivity: An empirical investigation of information systems faculty*. Available from ProQuest Dissertations & Theses Global. (UMI No. 305518774)

Al-Kahtani, N. K., Ryan, J. J., & Jefferson, T. I. (2006). How Saudi female faculty perceive internet technology usage and potential. *Information, Knowledge, Systems Management, 5*(4), 227-243.

Alkhazim, M. A. (2003). Higher education in Saudi Arabia: Challenges, solutions, and opportunities missed. *Higher Education Policy, 16*(4), 479-486.

Al-Medlej, H. I. (1997). *Decision making process in higher education institutions: The case of Saudi Arabia* (Doctoral dissertation). Middlesex University, London, UK.

Al Mohsen, M. A. (2014). The academic profession among faculty at Saudi universities. *European Scientific Journal, 9*(10).

Al-Muhanna, F. A. (2001, September). The motives for the Saudi faculty staff to join non-university work. *Bahrain Medical Bulletin, 23*(3).

Al-Ohali, M., & Al-Mehrej, H. (2012). Faculty salary and remuneration in the Kingdom of Saudi Arabia. In P. G. Altbach, L. Reisberg, M. Yudkevich, G. Androushchak, & I. F. Pacheco (Eds.), *Paying the professoriate: A global comparison of compensation and contracts* (pp. 278-287). New York, NY: Taylor & Francis.

Al-Ohali, M., & Shin, J. C. (2013). Knowledge-based innovation and research productivity in Saudi Arabia. In L. Smith & A. Abouammoh (Eds.), *Higher education in Saudi Arabia* (pp. 95-102). Springer Netherlands.

Alshaya, F. S. (2005). *Faculty research productivity and its obstacles at human science colleges at King Saud University*. King Saud University, Educational Research Center, College of Education, Saudi Arabia. Resalat Aljameah.

Alshayea, A. (2013). Scientific research in the Kingdom of Saudi Arabia: Potential for excellence and indicators of underdevelopment. *Higher Education Studies, 3*(5), 47.

Alsouhibani, M. A. (2000). *Attitudes toward research and teaching: Differences between faculty and administrators at three Saudi Arabian universities* (Doctoral dissertation). Available from ProQuest Dissertations and Theses. (UMI No. 304630219)

Al-Sultan, K. S., & Alzaharnah, I. T. (2012). Academia-industry innovation linkages in the case of Saudi Arabia: Developing a university-industry triple-helix framework to promote research and development collaboration. *Global innovation index* (pp. 91). KFUPM, KSA: INSEAD.

Al-Tamimi, D (2004). Saudi women in academic medicine Are they succeeding? *Saudi Medical Journal*, *25*(11), 1564-1567.

Al Yahya, S., & Irfan, M. (2012). *Faculty and staff handbook.* Qassim University, Saudi Arabia. Retrieved from http://www.cosao.qu.edu.sa/en/CollegePublications/Documents/Staff-Handbook.pdf

Altbach, P. (2014, May 22). *How Saudi Arabia can create an academic oasis*. Retrieved from http://www.timeshighereducation.co.uk/comment/opinion/how-saudi-arabia-can-create-an-academic-oasis/2013409.article

Altbach, P. G., & Mathews, E. (2012). *Progressive state*. *A half-century of Indian higher education: Essays by Philip G Altbach*. New Delhi, India: Sage.

Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2009). *Trends in global higher education: Tracking an academic revolution* (Report prepared for the UNESCO 2009 World Conference on Higher Education). Retrieved from http://www.uis.unesco.org/Library/Documents/trends-global-higher-education-2009-world-conference-en.pdf

Al-Yahya, K. O. (2007, August). The over-educated, under-utilized worker: Why doesn't human capital development bring desired outcomes? *Proceedings of the Academy of Management, 2007*(1), 1-6.

Alzahrani, J. A. (2011). Overcoming barriers to improve research productivity in Saudi Arabia. *International Journal of Business and Social Science, 2*(19), 1-8.

Alzahrani, S. (1997). Scientific productivity of Saudi Faculty members at Umm Alqura University: Its status and obstacles. *King Saud University, Education Science, 9*(1), 33-84.

Ashoor, M. S., & Chaudhry, A. S. (1993). Publication patterns of scientists working in Saudi Arabia. *The International Information & Library Review*, *25*(1), 61-71.

Auranen, O., & Nieminen, M. (2010). University research funding and publication performance—An international comparison. *Research Policy, 39*(6), 822-834.

Azad, A. N., & Sayyed, F. J. (2007). Factors influencing faculty research productivity: Evidence from AACSB accredited schools in the GCC countries. *Journal of International Business Research, 6*(1), 91-112.

Babbie, E. R. (1990). *Survey research methods (Vol. 2)*. Belmont, CA: Wadsworth.

Balakrishnan, M. S. (2013). Methods to increase research output: some tips looking at the MENA region. *International Journal of Emerging Markets, 8*(3), 215-239.

Baldwin, R., & Blackburn, R. (1981). The academic career as a developmental process: Implications for higher education. *The Journal of Higher Education, 52*(6), 598-614.

Baron, A., & Armstrong, M. (2007). Human capital management achieving added value through people. London, UK: Kogan Page.

Beam, W. W. (1976). *Factors associated with research productivity of graduate faculty members in home economics units* (Doctoral dissertation). Oklahoma State University, Stillwater.

Bean, J. P. (1982). *A causal model of faculty research productivity*. New York, NY: American Educational Research Association Annual Meeting. (ERIC No. ED216661).

Beatty, C. J., & Chan, M. J. (1984). Chinese scholars abroad: Changes in perceived academic needs. *The ESP Journal, 3*(1), 53-59.

Becker, G. (1964). *Human capital: A theoretical and empirical analysis, with a special reference to education*. Chicago, IL: University of Chicago Press.

Becker, G. (2008). Human capital. *The Concise Encyclopedia of Economics*. Library of Economics and Liberty. Retrieved from http://www.econlib.org/library/Enc/HumanCapital.html

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *The Journal of Political Economy, 70*(5) 9-49.

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (1st ed.). Chicago, IL: University of Chicago Press.

Bellas, M. L., & Toutkoushian, R. K. (1999). Faculty time allocations and research productivity: Gender, race and family effects. *The Review of Higher Education, 22*(4), 367-390.

Bentley, L., Roberson, D., Bell, I., Enzmann, D., Lohmann, S., Rhodes, D., & Shih, J. (2003, June). *Productivity, collaboration, and citizenship in academic departments*. NECSI Complex Systems Course, University of California at Los Angeles. Retrieved from http://www.necsi.edu/education/oneweek/summer03/NECSI.6.03.Academic.pdf

Bess, J. L. (1998, January). Contract systems, bureaucracies, and faculty motivation: The probable effects of a no-tenure policy. *Journal of Higher Education, 69,* 1-22.

Bhattacharjee, Y. (2011). Saudi universities offer cash in exchange for academic prestige. *Science, 334*(6061).

Bin Abdullah, A. G. K., & Isamail, I. (2012). An expletory analysis on the implementation challenges of human capital development skills through academic programmes: A case of public research university in Malaysia. *Dezbateri Social Economice,* 2/2012.

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: Motivation, expectation, satisfaction*. Baltimore, MD: Johns Hopkins Press.

Blair, M. M., & Kochan, T. A. (2000). *The new relationship: Human capital in the American corporation*. Washington, DC: Brookings Institution Press.

Bland, C., & Schmitz, C. (1986). Characteristics of the successful researcher and implications for faculty development. *Journal of Medical Education, 61*(1), 22-31.

Bland, C. J., Center, B. A., Finstad, D. A., Risbey, K. R., & Staples, J. G. (2005). A theoretical, practical, predictive model of faculty and department research productivity. *Academic Medicine, 80*(3), 225-237.

Bland, C. J., Center, B. A., Finstad, D. A., Risbey, K. R., & Staples, J. (2006). The impact of appointment type on the productivity and commitment of full-time faculty in research and doctoral institutions. *Journal of Higher Education, 89*-123.

Bland, C. J., & Ruffin, M. T., IV. (1992). Characteristics of a productive research environment: Literature review. *Academic Medicine, 67*(6), 385-97.

Bloom, N., & Van Reenen, J. (2011). Human resource management and productivity. *Handbook of Labor Economics, 4*, 1697-1767.

Boon, C., Den Hartog, D., Boselie, P., & Paauwe, J. (2011). The relationship between perceptions of HR practices and employee outcomes: Examining the role of person–organisation and person-job fit. *The International Journal of Human Resource Management, 22*(1), 138-162.

Borg, S., & Alshumaimeri, Y. (2012, April). University teacher educators' research engagement: Perspectives for Saudi Arabia. *Teaching and Teacher Education*: *An International Journal of Research and Studies, 28*(3), 347-356.

Bowles, S., & Gintis, H. (1975). The problem with human capital theory—a Marxian critique. *The American Economic Review*, *65*(2), 74-82.

Bozeman, B., & Corley, E. (2004). Scientists' collaboration strategies: Implications for scientific and technical human capital. *Research Policy, 33*(4), 599-616.

Bozeman, B., Dietz, J. S., & Gaughan, M. (2001). Scientific and technical human capital: An alternative model for research evaluation. *International Journal of Technology Management, 22*(7), 716-740.

Breault, D. A. (2011). The intensification of the professoriate. In D. M. Callejo Perez, S. M. Fain, & J. J. Slater (Eds.), Higher education and human capital: Re/thinking the doctorate (pp. 19-30). Rotterdam: SensePublishers.

Brew, A., & Lucas, L. (Eds.). (2009). *Academic research and researchers*. New York, NY: McGraw-Hill International.

Blundell, R., Dearden, L., Meghir, C., & Sianesi, B. (1999). Human capital investment: The returns from education and training to the individual, the firm and the economy. *Fiscal Studies, 20*(1), 1-23.

Cameron, S., & Blackburn, R. (1981). Sponsorship and academic career success. *The Journal of Higher Education, 52*(4), 369-377.

Cantwell, B., & Mathies, C. F. (2012). Expanding research capacity at United States universities: A study of academic research and development investment from 1990-2005. *Higher Education Quarterly, 66*(3), 308-330.

Carayol, N., & Matt, M. (2004). Does research organization influence academic production? Laboratory level evidence from a large European university. *Research Policy, 33*(8), 1081-1102.

Cater, B., Lew, B., & Pivato, M. (2009, November 10). *Why tenure?* Retrieved from https://www.trentu.ca/economics/documents/WhyTenure.pdf

Centra, J. A. (1977, July). How universities evaluate faculty performance: A survey of department heads (GRE Board Research Report GREB No. 75-5bR). Retrieved from https://www.ets.org/Media/Research/pdf/GREB-75-05BR.pdf

Centra, J. A. (1983). Research productivity and teaching effectiveness. *Research in Higher Education, 18*(4), 379-389.

Chaminade, C., & Vang, J. (2006). Globalization of knowledge production and regional innovation policy: Supporting specialized hubs in developing countries (CIRCLE, Lund University Paper No. 2006/15). Retrieved from http://wp.circle.lu.se/upload/CIRCLE/workingpapers/200615_Charminade_Vang.pdf

Chen, Y., Gupta, A., & Hoshower, L. (2006). Factors that motivate business faculty to conduct research: An expectancy theory analysis. *The Journal of Education for Business, 81*(4), 179-189.

Chen, Y., Gupta, A., & Hoshower, L. (2011). Faculty perceptions of research rewards. *Journal of College Teaching & Learning, 1*(12).

Coff, R. W. (1997). Human assets and management dilemmas: Coping with hazards on the road to resource-based theory. *Academy of Management Review, 22*(2), 374-402.

Colbeck, C. (1992). *Extrinsic rewards and intrinsic interest: The influence of tenure on faculty preference for teaching or research*. Paper presented at the annual meeting of the Association for the Study of Higher Education, Minneapolis, MN.

Conn, V. S., Porter, R. T., McDaniel, R. W., Rantz, M. J., & Maas, M. L. (2005). Building research productivity in an academic setting. *Nursing Outlook, 53*(5), 224-231.

Corneo, G. (2011). Stakeholding as a new development strategy for Saudi Arabia. *Review of Middle East Economics and Finance, 7*(1), 1-19.

Creswell, J. W. (1985). Faculty research performances: Lessons from the science and social sciences. ASHE-ERIC Higher Education Report, 4.

Crook, T. R., Todd, S. Y., Combs, J. G., Woehr, D. J., & Ketchen, D. J., Jr. (2011). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance. *Journal of Applied Psychology, 96*(3), 443.

Delaney, J. T., & Huselid, M. A. (1996). The impact of human resource management practices on perceptions of organizational performance. *Academy of Management Journal, 39*(4), 949-969.

Diamond, A. M. (1986). The life-cycle research productivity of mathematicians and scientists. *Journal of Gerontology, 41*(4), 520-525.

Dietz, J. S., & Bozeman, B. (2005). Academic careers, patents, and productivity: Industry experience as scientific and technical human capital. *Research Policy, 34*(3), 349-367.

Drubin, D. G., & Kellogg, D. R. (2012). English as the universal language of science: Opportunities and challenges. *Molecular Biology of the Cell, 23*(8), 1399-1399.

Dulaymi, S. T., Marghalani, M. A., McDonald, A., & Tait, J. I. (2004). The growth of electronic journals in academic libraries in Saudi Arabia. *Library Management, 25*(4/5), 190-198.

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

Eder, M., & Pierce, J. R., Jr. (2011). Innovations in faculty development: Study of a research assistance unit designed to assist clinician-educators with research. *Southern Medical Journal, 104*(9), 647-650.

Edler, J., Fier, H., & Grimpe, C. (2011). International scientist mobility and the locus of knowledge and technology transfer. *Research Policy, 40*(6), 791-805.

Elrick, R. M., Jenkinson, G. M., & Thomas, R. L. (1996). Academic collegiality in research and teaching. *Journal of Natural Resources and Life Sciences Education, 25*(1), 71-74.

El-Sanabary, N. (1994). Female education in Saudi Arabia and the reproduction. *Gender and Education, 6*(2), 141.

Estes, B., & Polnick, B. (2012, November) Examining motivation theory in higher education: An expectancy theory analysis of tenured faculty productivity. *International Journal of Management, Business, and Administration, 15*,(1).

Ferreira, A. I., & Martinez, L. F. (2011). Intellectual capital: Perceptions of productivity and investment. *Revista de Administração Contemporânea, 15*(2), 249-260.

Finkelstein, M. (1982, March). *Faculty colleagueship patterns and research productivity* (ERIC No. ED216633) Paper presented at the Annual Meeting of the American Educational Research Association, New York, NY.

Fitzsimons, P. (1999). Human capital theory and education. In M. Peters, T. Besley, A. Gibbons, B. Žarnić, & P. Ghiraldelli (Eds.), *The encyclopaedia of educational philosophy and theory*. Retrieved from http://eepat.net/doku.php?id=human_capital_theory_and_education

Fowler, F. J. (Ed.). (2009). *Survey research methods (Vol. 1)*. Thousand Oaks, CA: Sage.

Fox, K. J., & Milbourne, R. (1999). What determines research output of academic economists? *Economic Record, 75*(3), 256-267.

Fox, K., & Milbourne, R. (2006). Is it harder to fly with eagles when you work with turkeys? *Australian Economic Papers, 45*(4), 362-371.

Fox, M. F. (1983). Publication productivity among scientists: A critical review. *Social Studies of Science, 13*(2), 285-305.

Frankfort-Nachmias, C., & Nachmias, D. (2007). *Research methods in the social sciences*. New York, NY: Macmillan.

Freedman, S. (2012). Collegiality matters: Massachusetts public higher education librarians' perspective. *The Journal of Academic Librarianship, 38*(2), 108-114.

Freshwater, D., Sherwood, G., & Drury, V. (2006). International research collaboration issues, benefits, and challenges of the global network. *Journal of Research in Nursing, 11*(4), 295-303.

Froman, R. D., Hall, A. W., Shah, A., Bernstein, J. M., & Galloway, R. Y. (2003). A methodology for supporting research and scholarship. *Nursing Outlook, 51*(2), 84-89.

Gallarotti, G. M, & Al-Filali, I. Y. (2012). Smart development Saudi Arabia's quest for a knowledge economy. *International Studies, 49*(1-2), 47-76.

Gallivan, M. J., & Benbunan-Fich, R. (2006, April). Examining the relationship between gender and the research productivity of IS faculty. *Proceedings of the 2006 ACM SIGMIS CPR conference on computer personnel research: Forty four years of computer personnel research: achievements, challenges & the future* (pp. 103-113).

Garavan, T. N., Morley, M., Gunnigle, P., & Collins, E. (2001). Human capital accumulation: The role of human resource development. *Journal of European Industrial Training, 25*(2/3/4), 48-68.

Garcia Cepero, M. C. (2007). *Institutional and individual factors associated with faculty scholarly productivity* (Doctoral dissertation). Available from ProQuest Dissertations and Theses Global database. (UMI No. 304865341)

Gaston, J. (1978). The reward system in British and American science. New York, NY: John Wiley & Sons.

Gingras, Y., Lariviere, V., Macaluso, B., & Robitaille, J. P. (2008). The effects of aging on researchers' publication and citation patterns. PLOS| One. Doi: 10.1371/ournal.pone.0004048. Retrieved from http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0004048

Goodall, A. H., McDowell, J. M., & Singell, L. D. (2014, January). *Leadership and the research productivity of university departments* (IZA Discussion Paper). Retrieved from http://ftp.iza.org/dp7903.pdf

Grace-Martin, K. (2015, May 28). *When to leave insignificant effects in a model* [Blog post]. Retrieved from: http://www.theanalysisfactor.com/insignificant-effects-in-model/

Green, R. G. (1998). Faculty rank, effort, and success: A study of publication in professional journals. *Journal of Social Work Education, 34*(3), 415-426.

Greer, C. R. (2001). *Strategic human resource management*. New York, NY: Pearson College Division.

Gregorutti, G. (2008). A mixed-method study of the environmental and personal factors that influence faculty research productivity at small-medium, private, doctorate-granting universities (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 304416690)

Groves, R. M., Fowler, F. J., Jr., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2013). *Survey methodology*. New York, NY: Wiley.

Gutiérrez, L. (2011, December). Demographic challenges for sustainable development. *Journal of Sustainable Human Development, 7*(12).

Hadjinicola, G. C., & Soteriou, A. C. (2006). Factors affecting research productivity of production and operations management groups: An empirical study. *Advances in Decision Sciences, 2006*.

Hanley, A., Liu, W. H., & Vaona, A. (2011). *Financial development and innovation in China: Evidence from the provincial data* (Kiel Working Papers, No. 1673).

Hanover Research. (2014, May). *Building a culture of research: Recommended practices*. Retrieved from http://www.hanoverresearch.com/media/Building-a-Culture-of-Research-Recommended-Practices.pdf

Hanushek, E. A. (2013). Economic growth in developing countries: The role of human capital. *Economics of Education Review*, *37*, 204-212.

Hardré, P. L. (2012). Community college faculty motivation for basic research, teaching research, and professional development. *Community College Journal of Research and Practice*, *36*(8), 539-561.

Hardré, P. L., Beasley, A., Miller, R., & Pace, T. (2011). Faculty motivation for research: Across disciplines in research-extensive universities. *Journal of the Professoriate, 5*(2), 35-69.

Hardré, P. L., Miller, R. B., Beasley, A., Pace, T., Maxwell, M. S., & Xie, K. (2007). What motivates university faculty members to do research? Tenure-track faculty in research-extensive universities. *Journal of the Professoriate, 2*(1), 75-99.

Harney, B., Monks, K., Alexopoulos, A., Buckley, F., & Hogan, T. (2014). University research scientists as knowledge workers: Contract status and employment opportunities. *The International Journal of Human Resource Management, 25*(16), 2219-2233.

Harris, G., & Kaine, G. (1994). The determinants of research performance: A study of Australian university economists. *Higher Education, 27*(2), 191-201.

Hassna, L. O., & Raza, S. (2011). An assessment of the relationship between the faculty performance in teaching, scholarly endeavor, and service at Qatar University. *Research in Higher Education Journal, 10,* 1-18.

Hattie, J., & Marsh, H. W. (1996). The relationship between research and teaching: A meta-analysis. *Review of Educational Research, 66*(4), 507-542.

Hayes, R. M. (1983). Citation statistics as a measure of faculty research productivity. *Journal of Education for Librarianship*, *23*(3), 151-172.

Hedjazi, Y., & Behravan, J. (2011). Study of factors influencing research productivity of agriculture faculty members in Iran. *Higher Education, 62*(5), 635-647.

Heinze, T., Shapiro, P., Rogers, J. D., & Senker, J. M. (2009). Organizational and institutional influences on creativity in scientific research. *Research Policy, 38*(4), 610-623.

Heitor, M., Horta, H., & Mendonça, J. (2014). Developing human capital and research capacity: Science policies promoting brain gain. *Technological Forecasting and Social Change, 82*, 6-22.

Hemmings, B., & Kay, R. (2015). The relationship between research self-efficacy, research disposition and publication output. *Educational Psychology: An International Journal of Educational Psychology* (in press).

Hemmings, B., Kay, R., Sharp, J., & Taylor, C. (2012). A trans-national comparison of lecturer self-efficacy. *Journal of Further and Higher Education, 36*, 291–307. doi:10.1080/0309877X.2011.614932

Hesli, V. L., & Lee, J. M. (2011). Faculty research productivity: Why do some of our colleagues publish more than others?. *PS: Political Science and Politics, 44*(02), 393-408.

Hesli, V. L., Lee, J. M., & Mitchell, S. M. (2012). Predicting rank attainment in political science: What else besides publications affects promotion?. *PS: Political Science and Politics, 45*(3), 475-492.

Heinze, T., Shapira, P., Rogers, J. D., & Senker, J. M. (2009). Organizational and institutional influences on creativity in scientific research. *Research Policy, 38*(4), 610-623.

Horta, H. (2013). Deepening our understanding of academic inbreeding effects on research information exchange and scientific output: new insights for academic based research. *Higher Education, 65*(4), 487-510.

Hu, Q., & Gill, T. G. (2000). IS faculty research productivity: Influential factors and implications. *Information Resources Management Journal, 13*(2), 15-25.

Huff, R. F. (2006). Entries for transnationalism, human capital, governmentality, and organization culture. In M. Bevir (Ed.), *The encyclopedia of governance*. Thousand Oaks, CA: Sage.

Hunter, D. E. (1985). *Factors associated with the publication productivity of prolific higher education scholars* (Doctoral dissertation). Available from ProQuest Dissertations & Theses Full Text database. (UMI No. 303384524)

Huselid, M. A. (1995). The impact of human resource management practices on turnover, productivity, and corporate financial performance. *Academy of Management Journal, 38*(3), 635-672.

Hussien, H. B. (2011). Attitude of Saudi universities faculty members towards using learning management system (JUSUR). *The Turkish Online Journal of Educational Technology, 10*(2).

Islam, M. (2000). Academic publishing and the university presses: The case in a developing region (Saudi Arabia). *Journal of Scholarly Publishing, 32*(1), 24-32.

Iqbal, M. Z., & Mahmood, A. (2011). Factors related to low research productivity at higher education level. *Asian Social Science, 7*(2), 188.

Ito, J. K., & Brotheridge, C. M. (2007). Predicting individual research productivity: More than a question of time. *Canadian Journal of Higher Education, 37*(1), 1-25

Jaffe, A. B. (1989). Real effects of academic research. *The American Economic Review, 79*(5), 957-970.

Jahangirfard, M., & Amiri, Z. (2013). How the intellectual capital affects on rise of productivity of personnel in taxation affairs department. *World Applied Sciences Journal, 22*(5), 632-636.

Jamjoom, F. B., & Kelly, P. (2013). Higher education for women in the Kingdom of Saudi Arabia. In L. Smith & A. Abouammoh (Eds.), *Higher education in Saudi Arabia* (pp. 117-125). Springer Netherlands.

Jang-Ho, C., & Khan-Pyo, L. (2013). Effects of employees' perceptions on the relationship between HR practices and firm performance for Korean firms. *Personnel Review, 42*(5), 573-594. doi:http://dx.doi.org.proxy.library.vcu.edu/10.1108/PR-12-2011-0176

Jawhar, S. (2012). *Failure to encourage academic research hinders progress*. Retrieved from http://saudiwriter.blogspot.com/2012/09/failure-to-encourage-academic-research.html

Ju, M. (2010). The impact of institutional and peer support on faculty research productivity: A comparative analysis of research vs. non-research institutions. *Seton Hall University Dissertations and Theses (ETDs)*. Paper 1608. Retrieved from http://scholarship.shu.edu/cgi/viewcontent.cgi?article=2611&context=dissertations

Jung, J. (2012). Faculty research productivity in Hong Kong across academic discipline. *Higher Education Studies, 2*(4), 1.

Karukstis, K. K. (2010). Multiple approaches to transformative research. In *Transformative research at predominately undergraduate institutions* (p. 21). University of South Florida Scholar Commons. Retrieved from http://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1133&context=gly_facpub

Katz, J. S., & Martin, B. R. (1997). What is research collaboration? *Research Policy*, *26*(1), 1-18.

Khatib, A. M. (2011). The effect of the increase in oil revenue on government expenditures on education in Saudi Arabia. *Journal of Business Studies Quarterly, 3*(2), 74-76.

Kim, D., Wolf-Wendel, L., & Twombly, S. (2011). International faculty: Experiences of academic life and productivity in US universities. *The Journal of Higher Education, 82*(6), 720-747.

Kim, E. H., Morse, A., & Zingales, L. (2009). Are elite universities losing their competitive edge? *Journal of Financial Economics, 93*(3), 353-381.

Kim, S. (2003). The impact of research productivity on early retirement of university professors. *Industrial Relations: A Journal of Economy and Society, 42*(1), 106-125.

Kleinberg, S., & Oren, M. (2011). (Mis) allocating scientific credit. *Proceedings of the 43rd Annual ACM Symposium on Theory of Computing*.

Kraemer, K. L., & Perry, J. L. (1989). Institutional requirements for academic research in public administration. *Public Administration Review, 49*(1), 9-16.

Krieger, Z., (2007). *Saudi Arabia puts its billions behind western style higher education*. Retrieved from http://chronicle.com/weekly/v54/i03/03a00101.htm

Kurtz, D. L., Kees, J., & Tokar, T. (2004). An examination of intrinsic and extrinsic motivational factors that affect research productivity of marketing academicians. *Journal for Advancement of Marketing Education, 4*, 10.

Laband, D. N., & Tollison, R. D. (2000). Intellectual collaboration. *Journal of Political Economy, 108*(3), 632-662.

Labuschagne, H. A. (1988). Evaluation of academic research productivity: Necessity for some methods and indicators of productivity. *Koers-Bulletin for Christian Scholarship*, *53*(4), 568-579.

Le, T. (2011). Do government policies affect growth? Examining a model with R&D and factor accumulation. *Research in Economics, 65*(1), 62-70.

Leahey, E. (2006). Gender differences in productivity research specialization as a missing link. *Gender and Society, 20*(6), 754-780.

Leach, J. C., Melicher, R. W., Oswald, M., & Wermers, R. (2000). *Patterns of co-authorship and research production in finance academia.* Colorado: University of Colorado, 17-27. Retrieved from http://www.academicjournals.org.

Lee, S., & Bozeman, B. (2005). The impact of research collaboration on scientific productivity. *Social Studies of Science, 35*(5), 673-702.

Lertputtarak, S. (2008*). An investigation of factors related to research productivity in a public university in Thailand: A case study* (Doctoral dissertation). Victoria University, Melbourne, Australia.

Leung, W. (2009). *Job security and productivity: Evidence from academics*. Berkeley. CA: Department of Economics, University of California.

Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-Based Dentistry, 7*(1), 24-25.

Levin, S. G., & Stephan, P. E. (1989). Age and research productivity of academic scientists. *Research in Higher Education, 30*(5), 531-549.

Li, B., Millwater, J., & Hudson, P. (2008, November 30) *Building research capacity: Changing roles of universities and academics.* Paper presented at the Australian Association of Research in Education (AARE) Conference 2008, Brisbane, Australia.

Liu, Y. (2010*). Exploring multiple patterns of faculty productivity in stem disciplines at doctoral universities* (Doctoral dissertation). Pennsylvania State University, College Station.

Long, J. S., Allison, P. D., & McGinnis, R. (1993). Rank advancement in academic careers: Sex differences and the effects of productivity. American Sociological Review, *58*(5), 703-722.

Long, R. G., Bowers, W. P., Barnett, T., & White, M. C. (1998). Research productivity of graduates in management: Effects of academic origin and academic affiliation. *Academy of Management Journal, 41*, 704-714.

Lunenburg, F. (2011). Expectancy theory of motivation: Motivating by altering expectations. *International Journal of Management, Business, and Administration, 15*.

Mamiseishvili, K. (2010). Foreign-born women faculty work roles and productivity at research universities in the United States. *Higher Education, 60*(2), 139-156.

Mamiseishvili, K., & Rosser, V. J. (2010). International and citizen faculty in the United States: An examination of their productivity at research universities. *Research in Higher Education, 51*(1), 88-107.

Marimuthu, M., Arokiasamy, L., & Ismail, M. (2009). Human capital development and its impact on firm performance: Evidence from developmental economics. *The Journal of International Social Research, 2*(8), 265-272.

Marsh, H. W., & Hattie, J. (2002). The relation between research productivity and teaching effectiveness: Complementary, antagonistic, or independent constructs? *Journal of Higher Education, 73*(5), 603-641.

Mazawi, A. (2005). The academic profession in a reinter state: The professoriate in Saudi Arabia. *Minerva, 43*(3), 221-244. doi: 10.1007/s11024-005-6473-5

McCormack, J., Proppe , C., & Smith, S. (2013, June). *Herding cats? Management and university performance* (Working Paper No. 13/308). Centre for Market and Public Organisation, Bristol University, UK.

McGill, M. M., & Settle, A. (2012). Identifying effects of institutional resources and support on computing faculty research productivity, tenure, and promotion. International *Journal of Doctoral Studies, 7*.

McPhedran, C. (Ed.). (2013, October 15). How Saudi universities rose in the global rankings. *Al-Fanar Media*. Retrieved from http://www.al-fanarmedia.org/2013/10/how-saudi-universities-rose-in-the-global-rankings/

Meho, L. I., & Yang, K. (2006). *A new era in citation and bibliometric analyses: Web of Science, Scopus, and Google Scholar*. Retrieved from http://arxiv.org/abs/cs/0612132

Meo, S. A., Hassan, A., & Usmani, A. M. (2013). Research progress and prospects of Saudi Arabia in global medical sciences. *European Review for Medical and Pharmacological Sciences, 17*(24), 3265-3271.

Merton, R. K. (1988). The Matthew effect in science. II: Cumulative advantage and the symbolism of intellectual property. *Journal of the History of Science Society, 79*, 606-623.

Middlehurst, R. (2004). Changing internal governance: A discussion of leadership roles and management structures in UK universities. *Higher Education Quarterly, 58*(4), 258-279.

Middlehurst, R. (2007). Human resource development: A UK perspective. In B. Conraths, & A. Trusso (Eds.). *Managing the university community: Exploring good practice* (pp. 96-98). London, UK: Leadership Foundation for Higher Education.

Milem, J. F., Berger, J. B., & Dey, E. L. (2000). Faculty time allocation: A study of change over twenty years. *Journal of Higher Education, 71,* 411-425.

Mincer, J. (1958). Investment in human capital and personal income distribution. The Journal of Political Economy, *66,* 281-302.

Mishra, V., & Smyth, R. (2013). Are more senior academics really more research productive than junior academics? Evidence from Australian law schools. *Scientometrics, 96*(2), 1-15.

Moran, E. T., & Volkwein, J. F. (1988). Examining organizational climate in institutions of higher education. *Research in Higher Education, 28*(4), 367-383.

Mudiwa, P. (2006). *An investigation of scholarly productivity of faculty in doctorate-granting institutions in the intermountain region of the United States* (Doctoral dissertation). Available from ProQuest Dissertations and Theses database. (UMI No. 304950235)

Nachmias, C., & Nachmias, D. (2007). *Research methods in the social sciences* (7th ed.). New York, NY: Worth.

Nafukho, F. M., Hairston, N., & Brooks, K. (2004). Human capital theory: Implications for human resource development. *Human Resource Development International, 7*(4), 545-551. doi:10.1080/1367886042000299843

Nathans L., Oswald, F., & Nimon, K. (2012, April). Interpreting multiple linear regression: A guidebook of variable importance. *Practical Assessment, Research and Evaluation, 17*(9).

National Science Foundation, Division of Science Resources Statistics. (2003). *Gender differences in the careers of academic scientists and engineers: A literature review* (NSF 03-322). Retrieved from http://www.nsf.gov/statistics/nsf03322/pdf/nsf03322.pdf

Nguyen, Q., & Klopper, C. (2014). The influences of research environment within a university on research productivity of academic staff. A case study in a research-oriented university in Vietnam. *Humanities and Social Sciences Review, 3*(3).

Okiki, O. C. (2013). Research productivity of teaching faculty members in Nigerian federal universities: An investigative study. *Chinese Librarianship: An International Electronic Journal, 36.*

Olaniyan, D. A. (2008). Human capital theory: Implications for educational development. *European Journal of Scientific Research, 24*(2), 157-162.

Onsman, A. (2010). Dismantling the perceived barriers to the implementation of national higher education accreditation guidelines in the Kingdom of Saudi Arabia. *Journal of Higher Education Policy and Management, 32*(5), 511-519.

Onsman, A. (2011). It is better to light a candle than to ban the darkness: Government led academic development in Saudi Arabian universities. *Higher Education, 65*, 519-532.

Osadebe, P. U. (2014). Assessment score of university lecturers. *Journal of Education and Practice, 5*(2), 8-14.

Pappas, J., & Eckart, C. M. (1997). Strategies for the future: Continuing higher education and economic development. *New Directions of Higher Education, 97*(3).

Paul, C. W., Rubin, P. C., & Paden, D. W. (1984). Teaching and research: The human capital paradigm. *Journal of Economic Education*, 142-147.

Perna, L. W. (2001). Sex differences in faculty salaries: A cohort analysis. *The Review of Higher Education, 24*(3), 283-307.

Pezzoni, M., Sterzi, V., & Lissoni, F. (2012). Career progress in centralized academic systems: Social capital and institutions in France and Italy. *Research Policy, 41*(4), 704-719.

Ponjuan, L., Conley, V. M., & Trower, C. (2011). Career stage differences in pre-tenure track faculty perceptions of professional and personal relationships with colleagues. *The Journal of Higher Education, 82*(3), 319-346.

Ponomariov, B. L., & Boardman, P. C. (2010). Influencing scientists' collaboration and productivity patterns through new institutions: University research centers and scientific and technical human capital. *Research Policy, 39*(5), 613-624.

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

Porter, S. R., & Toutkoushian, R. K. (2006). Institutional research productivity and the connection to overall student quality and overall reputation. *Economics of Education Review, 25*(6), 605-617.

Powers, J. B. (2003). Commercializing academic research: Resource effects on performance of university technology transfer. *The Journal of Higher Education, 74*(1), 26-50.

Pfeffer, J. (1994). *Competitive advantage through people: Unleashing the power of the work force*. Boston, MA: Harvard Business School Press.

Pratt, M., Margaritis, D., & Coy, D. (1999). Developing a research culture in a university faculty. *Journal of Higher Education Policy and Management, 21*(1), 43-55.

Prince, M. J., Felder, R. M., & Brent, R. (2007). Does faculty research improve undergraduate teaching? An analysis of existing and potential synergies. *Journal of Engineering Education, 96*(4), 283-294.

Project Kaleidoscope. (n.d.). Investment in faculty: Ways and means. *What works, what matters, what lasts.* Retrieved from http://www.pkal.org/documents/ACFA9.pdf

Prpić, K. (2002). Gender and productivity differentials in science. *Scientometrics, 55*(1), 27-58.

Qandile, Y. A., & Oganesyants, N. (2014). Positioning for international market segments in higher education: Evidence from Saudi Arabia. *Business Education and Accreditation, 6*(2), 61-69.

Qureshi, R. (2014). Human resources development and the status of women labor force in Saudi Arabia: a critical analysis. *International Journal of Current Research and Academic Review*, *2*(4), 144-155.

Rakes, G. C., & Rakes, T. A. (1997). Encouraging faculty collegiality. *National Forum of Educational Administration and Supervision Journal, 14*, 3-12. College of Education and Behavioral Sciences, Northwestern State University.

Ramsden, P. (1994). Describing and explaining research productivity. *Higher Education, 28*(2), 207-226.

Ramsden, P., & Moses, I. (1992). Associations between research and teaching in Australian higher education. *Higher Education*, *23*(3), 273-295

Rebne, D. S. (1988). *Determinants of individual productivity: The case of academic research* (Doctoral dissertation). Available from ProQuest Dissertations and Theses Global database. (UMI No. 303692871)

Riley, S. M. (2012). *Market valuation of firm investments in training and human capital management* (Doctoral dissertation). University of Illinois, Urbana-Champaign.

Rodgers, J. R., & Neri, F. (2007). Research productivity of Australian academic economic: Human capital and fixed effects. *Australian Economic Papers, 46*(1), 67-87.

Rothausen-Vange, T. J., Marler, J. H., & Wright, P. M. (2005). Research productivity, gender, family, and tenure in organization science careers. *Sex Roles, 53*(9-10), 727-738.

Rush, S. C., & Wheeler, J. (2011). Enhancing junior faculty research productivity through multi-institution collaboration. Participants' impressions of the school psychology research collaboration conference. *Canadian Journal of School Psychology, 26*(3), 220-240.

Sadi, A. M. (2006). Barriers to organizational creativity: A perspective of national and expatriate academics in Saudi Arabia. *International Management Review Journal, 2*(4).

Sahel, J. A. (2011). Quality versus quantity: Assessing individual research performance. *Science Translational Medicine, 3*(84).

Saudi Ministry of Higher Education. (2012). *About government universities.* Retrieved from http://www.mohe.gov.sa/en/studyinside/Government-Universities/Pages/default.aspx

Saudi Ministry of Higher Education. (2015, March 29). *About the kingdom*. Retrieved from http://he.moe.gov.sa/en/studyinside/about KSA/Pages/default.aspx

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

Scarborough, H. & Elias, J. (2002) *Evaluating human capital*. London, UK: Chartered Institute of Personnel and Development.

Schultz, T. W. (1961, March). *Investment in human capital*. *The American Economic Review, 51*(3), 1-17.

Schultz, T. W. (1972). Human capital: Policy issues and research opportunities. *Economic Research: Retrospect and Prospect Vol 6: Human Resources*, 1-84.

Shin, J. (2009). Building world-class research university: The Brain Korea 21 project. *Higher Education, 58,* 669-688.

Shin, J., Lee, C., & Kim, S. (2012). Knowledge-based innovation and collaboration: A triple-helix approach in Saudi Arabia. *Scientometrics, 90*(1), 311-326.

Siegel, D. S., Waldman, D., & Link, A. (2003). Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. *Research Policy, 32*(1), 27-48.

Smeby, J., & Try, S. (2005). Departmental contexts and faculty research activity in Norway. *Research in Higher Education, 46*(6), 593-619.

Smith, L., & Abouammoh, A. (2013). Higher education in Saudi Arabia: Reforms, challenges and priorities. In L. Smith, & A. Abouammoh (Eds.), *Higher education in Saudi Arabia* (pp. 1-12). Springer Netherlands.

Snell, S. A., & Dean, J. W. (1992). Integrated manufacturing and human resource management: A human capital perspective. *Academy of Management Journal, 35*(3), 467-504.

Song, H. (Ed.). (2009). *Handbook of research on human performance and instructional technology.* Hershey, PA: IGI Global.

Stack, S. (2004). Gender, children and research productivity. *Research in Higher Education, 45*(8), 891-920.

Stensaker, B., & Lee, H. (Eds.). (2011). *Accountability in higher education: Global perspectives on trust and power*. London, UK: Routledge.

Stiles, P., & Kulvisaechana, S. (2003). *Human capital and performance: A literature review*. Retrieved from http://www.bus.tu.ac.th/usr/sab/Articles_pdf/Research_Papers/DTI_Paper_web.pdf

Storberg-Walker, J. (2004). *Towards a theory of human capital transformation through human resource development* (Doctoral dissertation). Available from ProQuest Dissertations and Theses Global database. (UMI 305157822)

Strathman, J. G. (2000). Consistent estimation of faculty rank effects in academic salary models. *Research in Higher Education, 41*(2), 237-250.

Suciu, L. E., Mortan, M., & Lazar, L. (2013). Vroom's expectancy theory. An empirical study: Civil servant's performance appraisal influencing expectancy. *Transylvanian Review of Administrative Sciences, 9*(39), 180-200.

Taylor, M. S., Locke, E. A., Lee, C., & Gist, M. E. (1984). Type A behavior and faculty research productivity: What are the mechanisms? *Organizational Behavior and Human Performance, 34*(3), 402-418.

Tenopir, C. W., & King, D. W. (2000), *Towards electronic journals: Realities for scientists*. Washington, DC: Librarians and Publishers, Special Libraries Association.

Teodorescu, D. (2000). Correlates of faculty publication productivity: A cross-national analysis. *Higher Education, 39*(2), 201-222.

Tien, F. F., & Blackburn, R. T. (1996). Faculty rank system, research motivation, and faculty research productivity: Measure refinement and theory testing. *The Journal of Higher Education, 67*(1), 2-22

Tien, F. F. H. (1994). *Promotion, motivation, and faculty research productivity: Theory testing and model construction for a Taiwanese setting* (Doctoral dissertation). University of Michigan, Ann Arbor.

Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection. *Ethnobotany Research and Applications, 5*, 147-158.

Townsend, B. K., & Rosser, V. J. (2007). Workload issues and measures of faculty productivity. *Thought and Action*, *23*, 7-19.

U.S.-Saudi Arabian Business Council, (2009). *The education sector in the Kingdom of Saudi Arabia*. Retrieved from http://www.us sabc.org/files/public/education_brochure.pdf

Van der Weijden, I., De Gilder, D., Groenewegen, P., & Klasen, E. (2008). Implications of managerial control on performance of Dutch academic (bio)medical and health research groups. *Research Policy*, *37*(9), 1616-1629.

Varshney, D., & Damanhouri, H.(2012, December). Senior female faculty research support dimensions in Saudi Arabia: An empirical investigation. *International Journal of Commerce, Business and Management*, *1*(3), 2319-2828.

Ventura, O. N., & Mombrú, A. W. (2006). Use of bibliometric information to assist research policy making. A comparison of publication and citation profiles of full and associate professors at a school of chemistry in Uruguay. *Scientometrics*, *69*(2), 287-313

Wallsten, S. (2004). *Regulation and internet use in developing countries*. Washington, DC: American Enterprise Institute-Brookings Joint Center.

Wanner, R. A., Lewis, L. S., & Gregorio, D. I. (1981). Research productivity in academia: A comparative study of the sciences, social sciences and humanities. *Sociology of Education*, *54*, 238-253.

Webber, K. L. (2011, June). *Faculty research productivity at U.S. institutions: The contribution of immigrant status and other select characteristics*. Scholarly paper presented at the UK and Ireland Institutional Conference, London.

Webber, K. L. (2013). Research productivity of science and engineering faculty at U.S. universities: The contribution of foreign vs. U.S.-born status. *Journal of the Professoriate, 7*(1), 52.

Webster, D. S., & Conrad, C. F. (1986). Using faculty research performance for academic quality rankings. *New Directions for Institutional Research*, *1986*(50), 43-57.

Williamson, I. O., & Cable, D. M. (2003). Predicting early career research productivity: The case of management faculty. *Journal of Organizational Behavior, 24*(1), 25-44.

Wood, F. (1990). Factors influencing research performance of university academic staff. *Higher Education, 19*(1), 81-100.

Wright, P. M., & Boswell, W. R. (2002). Desegregating HRM: A review and synthesis of micro and macro HR research. *Journal of Management, 28,* 247-276.

Wright, P. M., McMahan, G. C., & McWilliams, A. (1994). Human resources and sustained competitive advantage: a resource-based perspective. *International Journal of Human Resource Management, 5*(2), 301-326.

Wright, P. M., & Nishii, L.H. (2007). *Strategic HRM and organizational behavior: Integrating multiple levels of analysis* (Technical Report 07-03). Center for Advanced Human Resource Studies, Cornell University, Ithaca, NY.

Xie, Y., & Shauman, K. A. (1998). Sex differences in research productivity: New evidence about an old puzzle. *American Sociological Review, 63,* 847-870.

Yang, K., & Meho, L. I. (2006). Citation analysis: A comparison of Google scholar, Scopus, and Web of Science. *Proceedings of the American Society for Information Science and Technology*, *43*(1), 1-15.

Ynalvez, M. A., & Shrum, W. M. (2011). Professional networks, scientific collaboration, and publication productivity in resource-constrained research institutions in a developing country. *Research Policy, 40*(2), 204-21.

Youndt, M. A. & Snell, S. A. (2001) *Human resource management, intellectual capital, and organizational performance* (Working Paper). Skidmore College.

Yusuf, N. (2014). Delivering long-term sustainable growth through investment in young people-Saudi Arabia. *International Journal of Business & Economic Development, 2*(3).

Zainab, A. N. (2000). Publication productivity, focus on institutional, collaborative and communicational correlates: A review of literature. *Malaysian Journal of Library and Information Science, 5*(1), 53-94.

Zheng, W., Yang, B., & McLean, G. N. (2010). Linking organizational culture, structure, strategy, and organizational effectiveness: Mediating role of knowledge management. *Journal of Business Research, 63*(7), 763-771.

Appendix A

Research Survey

Please choose the language you would like to complete the survey in

الرجاء اختيار اللغه التي ترغب اكمال الاستبانه بها

- **English**
- **العربيه**

دعوة للمشاركة في استبيان رسالة دكتوراه

الاختلافات في الإنتاج البحثي بين أعضاء هيئة التدريس في الجامعات الحكومية السعودية

عزيزي عضو هيئة التدريس:

أنا طالبة دكتوراه في جامعة فرجينيا كومنولث في تخصص السياسة العامة والإدارة وترتكز أطروحتي للدكتوراه بشكل رئيسي على سياسات التعليم العالي العامة السعودية، حيث أقوم بدراسه العوامل المرتبطة بالإختلافات في الإنتاجية البحثية بين أعضاء هيئة التدريس في الجامعات الحكومية السعودية.

كونك جزءا من عينة تمثيلية من أعضاء هيئة التدريس في الجامعات الحكومية السعودية ستكون مشاركتك مهمه و حاسمة في نجاح هذه الدراسة، و البيانات التي سيتم جمعها ستساعد في توفير معلومات مفيدة عن حالة البحوث الأكاديمية في الجامعات الحكومية السعودية.

الاستبيان التالي سيستغرق منك عشر دقائق لإكماله. ليس هناك تعويض للمشاركة في هذه الدراسة أو أي خطر معروف للإجابة على أسئلته. يرجى الإجابة على جميع الأسئلة بصراحة. من أجل الحفاظ على سريه معلوماتك وهويتك من فضلك لا تدرج اسمك في هذا الاستبيان.

استكمال وإعادة الاستبيان تشير لاستعدادكم للمشاركة في هذه الدراسة بطواعيه. إذا كنت تحتاج إلى معلومات إضافية أو لديك أسئلة يرجى التواصل معي عن طريق البريد الالكتروني الوارد أدناه.

أقدر لك الوقت الذي قضيته لاستكمال هذا الاستبيان.

بيان السرية: سيتم الحفاظ على المعلومات الوارده بهذا الاستبيان بسريه كامله وسيطلع عليها المشارك بالبحث فقط.

أبعاد الزومان

باحثه دكتوراه في جامعه فرجينيا كومونويلث

Dear Faculty Member:

I am a PhD candidate at Virginia Commonwealth University majoring in Public Policy and Administration and focusing mainly on Saudi public higher education policies. For my PhD dissertation, I am examining factors associated with research productivity differences among faculty members in Saudi public universities.

You are part of a representative sample of faculty members in Saudi public universities so your participation and opinions are critical to the success of this study. The data collected will assist me in my educational endeavors and will provide useful information regarding the condition of the academic research in Saudi public universities.

The following questionnaire takes ten minutes to complete. There is no compensation for participation in this study nor is there any known risk for answering this questionnaire. Please answer all questions as honestly as possible. All questionnaires are submitted electronically and anonymously and thus your identity cannot be identified by the researcher using any of the information you provide. In order to ensure that all information will remain confidential, please do not include your name in any part of this questionnaire.

Completion and return of the questionnaire will indicate your willingness to participate in this study. However, you can stop answering the questionnaire and withdraw from the study anytime you decide not to participate and withdraw from the study.

If you require additional information or have questions, please contact me at the email listed below. I appreciate the value of your time, and sincerely appreciate your participation.

Confidentiality Statement: Your responses and information obtained from this study will be held in confidence, and cannot be accessed by anyone accept by the researcher.

Abad Nasser

Part I: Institutional Factors

1- Research Climate

I. Listed below is a series of statements that represent your feelings about the institutional factors you think are related to your university, please indicate the degree of your agreement or disagreement with each statement by choosing the most correct response reflecting your opinion.

1- The current academic environment stimulates me to do more research collaboration with my colleagues

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

2- Level of intellectual stimulation in my day to day contacts with faculty colleagues is satisfactory

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

3- In the current academic work setting, I can cooperate in research work effectively with opposite sex colleagues

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

4- Visiting scholars programs in my university positively impact research outcomes of faculty members

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

5- My university enables me to contribute to theoretical developments in my discipline autonomously

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

6- publishing in referee journals is promoted by my university

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

7- The promotion system in Saudi universities encourages faculty members to be more research productive

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

8- The administrative procedures I have to follow to request research fund in my university are simple

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

9- Financial incentives for scientific publication provided by the university stimulate me to engage in research work

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

10- Research centers in the university support faculty members' research projects

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

11- A faculty member is encouraged to conduct research in English language at the university

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

12- Academic freedom level in the university allows faculty to do research without restrictions

Strongly Disagree	Disagree	Agree	Strongly Agree	Don't know

13. Are the following services provided by your university to support your research?? Please check

	Yes	No
Course release time		
Research assistant		
Research funds		
Sabbatical Leave		
Access to academic library		
Access to computers		
Access to labs		
Academic editing and translating services		

14- Do you believe that the following research services are important to promote research productivity among faculty members in your university

	Not at all	Not very Important	Important	Very Important
Course release time				
Research assistant				
Research funds				
Sabbatical Leave				
Access to academic library				
Access to computers				
Access to labs				
Academic editing and translating services				

15- Please write any further comments on desired research services you wish are provided by the university

……

16- How many academic collaboration programs is your university participating in with other international or national universities

- 1-2 programs
- 3-4 programs
- 5-6 programs
- 7-8 programs
- More than 8 programs

17- How many times have you participated in these programs since 2008 in your present university?

- None
- 1-2 times
- 3-4 times
- 5-6 times
- More than 7 times

18 -Describe the nature of your participation in these programs?

- Resrach
- Teaching
- Administrative

Other (please specify) ……

II Personal information

For each item below, please check the most correct response and fill in the required information

19-Your gender

- Female
- Male

20-Martial Statues

- Single
- Married
- Widowed
- Divorced

21- How many children do you have

- None
- 1-2
- 3-5
- above 5

22- Which category below includes your age?

- 40 and younger
- 41-50
- 51and older

III Professional Factors

23- Academic rank

- Assistant Professor/
- Associate Professor/
- Professor/

24- Origin of Earned Academic Degree

- Saudi
- Middle Eastern
- Asian
- Westerner

Other (please specify)

25-Other than your native language, which language are you proficient in

- None
- Arabic/
- English
- French

Other (please specify)……..

26- How many hours do you spend doing academic reading and writing academic papers per week

- None
- Under 10 hrs
- 10-20 hrs
- 21-30 hrs 2
- 31 hrs and above

27- Years of employment with your present university:

- less than a year
- 1-2 years/
- 3-4 years
- 5-6 years
- over 6 years

28-How long have you worked in academia

- less than a year
- 1-5 years
- 6-10years
- 11-20 years/
- over 20 years

29- Region of Citizenship/

- Saudi
- Arab
- Asian
- Westerner/

Other (please specify) ……

30-How many times do you attend scientific conferences and academic workshops per year

- Never attend ٧
- 1-2 times
- 3-4 times
- 5-6 times
- More than 7

31- What is your typical teaching load each semester (how many credit hours)

- Under 3 hrs
- 3-6 hrs
- 7-9 hrs
- 10-12 hrs
- 13 and above

32- The weekly hours you spend in the administrative work; correcting exams, submitting degrees..etc

- Under 5 hrs
- 5-10hrs
- 11-15 hrs
- 16-20 hrs
- Over 20 hrs

33-Please give your best estimate of the number of your research work since 2008 in your present university for each of the following.

	Never	1-2	3-4	4-5	above 6
Number of published articles in referred academic journals					
Number of published articles in professional journals					
Number of published books					
Number of edited or translated books					
Number of published chapters					
Number of papers presented in scientific conferences/					

34- Which of the following best describes your current primary field of teaching and research

- Medicine and health sciences
- Social sciences
- Natural sciences and Engineering
- Humanities and arts
- Technology and technical studies

الجزء الاول : العوامل المؤسسيه

1- البيئه الأكاديميه:

تجد ادناه سلسله من الجمل تهدف لمعرفة رأيك حول اثر العوامل المؤسسيه التاليه على الإنتاج البحثي بجامعتك.الرجاء تحديد مدى اتفاقك مع كل جمله

1. تحفز الأجواء الأكاديميه الحاليه التعاون البحثي مع زملائي بالجامعه

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

2- مستوى التحفيز الفكري الذي أحصل عليه من خلال تواصلي اليومي مع زملائي الأكاديميين مرضي

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

3- استطيع التعاون بفعاليه في الأنشطه البحثيه مع اعضاء هيئه التدريس من الجنس الاخر في بيئه العمل الأكاديميه الحاليه

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

4- برامج الأساتذه الزائرون يؤثر بإيجابيه على الإنتاج البحثي لأعضاء هيئه التدريس

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

5- تتيح لي جامعتي المساهمه في التطوير النظري في تخصصي الأكاديمي باستقلاليه

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

6- تشجع جامعتي النشر في المجلات العلميه المحكمه

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

7- نظام الترقيه الحاليه في الجامعات السعوديه يحفز اعضاء هيئه التدريس ليكونوا اكثر فعاليه

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

8- الاجراءات الاداريه لطلب تمويل مشروع بحثي سهله

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

9- الحوافز الماليه المقدمه من الجامعه للنشر العلمي تحفزني للانخراط في العمل البحثي

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

10- مركز الأبحاث في الجامعه يدعم مشاريع البحث العلمي لاعضاء هيئه التدريس

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

11- تشجع الجامعه عضو هيئه التدريس على اجراء البحث العلمي باللغه الانجليزيه

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

12- مستوى الحرية الاكاديمية في الجامعه يتيح لاعضاء هيئه التدريس اجراء البحث العلمي دون قيود

لا اعلم	موافق بشدة	موافق	غير موافق	غير موافق بشدة

13- هل الخدمات التاليه لدعم البحث العلمي متوفره في جامعتك؟

الخدمه	نعم	لا
تخفيف نصاب ساعات التدريس		
توفير مساعد باحث		
تمويل ابحاث		
اجازة البحث العلمي		
القدرة على دخول مكتبات اكاديمية متخصصه		
توفير اجهزه كمبيوتر		
توفير معامل		
توفير خدمه تدقيق وترجمه اكاديميه		

14- هل تعتقد ان خدمات البحث العلمي التاليه اساسية لتحفيز اعضاء هيئه التدريس للقيام بالبحث العلمي في جامعتك

الخدمه	مهمه جدا	مهمه	ليست مهمه جدا	ليست مهمه ابدا
تخفيف نصاب ساعات التدريس				
توفير مساعد باحث				
تمويل ابحاث				
اجازة البحث العلمي				
القدرة على دخول مكتبات اكاديمية متخصصه				
توفير اجهزه كمبيوتر				
توفير معامل				
توفير خدمه تدقيق وترجمه اكاديميه				

15 - الرجاء تدوين ملاحظاتك بخصوص الخدمات البحثيه الاخرى التي تتمنى ان تقوم الجامعه بتقديمها

.....

16- كم عدد برامج التعاون الاكاديمي التي تشارك بها جامعتك مع جامعات محليه ودوليه

- 1- 2 برامج
- 3 – 4 برامج
- 5- 6 برامج
- 7 – 8 برامج
- اكثر من 8 برامج

17 كم عدد المرات التي شاركت بها في هذه البرامج منذ عام 2008 في جامعتك الحاليه؟

- ولامره
- مره الى مرتين
- 3- 4 مرات
- 5- 6 مرات
- 7 مرات او اكثر

18- صف طبيعه مشاركتك بهذه البرامج

- بحثيه
- تدريسيه
- اداريه
- اخرى (الرجاء تحديدها)

الجزء الثاني : معلومات شخصيه

الرجاء اختيار الاجابه الصحيحه فيما يلي.

19- الجنس

○ أنثى ○ ذكر

20 - الحاله الاجتماعيه

○ عازب ○ متزوج ○ ارمل ○ مطلق

21- كم طفلا لديك

○ لا يوجد ○ 1- 2 ○ 3- 5 ○ فوق 5 اطفال

22- الى اي مرحله عمريه تنتمي

○ 40 سنه او اقل ○ 41- 51 سنه ○ 51 سنه فأكثر

الجزء الثالث : العوامل المهنيه

23- ماهي رتبتك الاكاديميه

○ استاذ مساعد ○ استاذ مشارك ○ استاذ بروفيسور

24- صدرت درجتك للدكتوراه من جامعه

○ سعوديه ○ شرق اوسطيه ○ اسيويه ○ غربيه ○ اخرى (حدد) .....

25- الرجاء تحديد اي من اللغات التاليه تتقن

○ لا يوجد ○ العربيه ○ الانجليزيه ○ الفرنسيه ○ اخرى (حدد) .....

26- كم عدد الساعات الاسبوعيه التي تقضيها بالقراءه والكتابه الاكاديميه

○ لا يوجد ○ اقل من عشر ساعات ○ 10- 20 ساعه ○ 21- 30 ساعه ○ اكثر من 31 ساعه

27- كم عدد السنوات التي قضيتها بالعمل لصالح جامعتك الحاليه

○ اقل من سنه ○ سنه الى سنتين ○ 3- 4 سنوات ○ 5 – 6 سنوات ○ اكثر من 6 سنوات

28- كم اجمالي السنوات التي قضيتها بالعمل الاكايمي حتى الان

○ اقل من سنه ○ 1- 5 سنوات ○ 6- 10 سنوات ○ 11- 20 سنه ○ اكثر من 20 سنه

29- ماهي جنسيتك

○ سعودي ○ عربي ○ اسيوي ○ غربي

30- كم عدد المؤتمرات والورش العلميه التي تلتحق بها سنويا

○ لا احضر ابدا ○ مره الى مرتين ○ 3 – 4 مرات ○ 5- 6 مرات ○ اكثر من 6 مرات

31- ماهو نصابك التدريسي المعتاد في كل فصل دراسي

○ اقل من 3 ساعات ○ 3- 6 ساعات ○ 7- 9 ساعات ○ 10- 12 ساعه ○ 13 ساعه فأكثر

32- كم عدد الساعات الاسبوعيه التي تقضيها لانجاز مهام اداريه وورقيه مثل تصحيح الاوراق او تسليم الدرجات

○ اقل من 5 ساعات ○ 5- 10 ساعات ○ 11- 15 ساعه ○ 16- 20 ساعه ○ اكثر من 20 ساعه

33- الرجاء تحديد عدد انشطتك البحثيه المنفذه اثناء عملك في جامعتك الحاليه خلال 5 سنوات من عام 2008 وفقا للجدول التالي

النشاط البحثي	لم اقم بهذا االنشاط	2 -1	4-3	6-5	اكثر من 6
الابحاث المنشوره في المجلات العلميه المحكمه					
الابحاث المنشوره في المجلات المهنيه					
الكتب المنشوره					
الكتب المدققه اوالمترجمه					
الفصول المنشورة في الكتب					
الاوراق المقدمه في المؤاتمرات العلميه					

34- ماهو تخصصك الاكاديمي

- ○ الطب والعلوم الصحيه
- ○ الانسانيات والفنون
- ○ الدراسات الاجتماعيه
- ○ التقنيه والدرسات الفنيه
- ○ العلوم الطبيعه والهندسه

Appendix B

Results of the Tests

***t*-tests**

Table B-1

Group Statistics

	19-your gender	N	Mean	Std. deviation	Std. error mean
Published articles in professional journals.	Female/	116	1.1121	1.47307	.13677
	Male/	273	1.4396	1.59877	.09676

Table B-2

Independent Samples Test

	Levene's test for equality of variances		*t*-test for equality of means						
								95% confidence interval of the difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Published articles in professional journals.	7.922	.005	-1.891	387	.059	-.32749	.17317	-.66797	.01298
Equal variances not assumed			-1.955	234.131	.052	-.32749	.16754	-65757	.00259

Table B-3

Group Statistics

	19-your gender	N	Mean	Std. deviation	Std. error mean
Published books	Female/	116	.4138	.73507	.06825
	Male/	273	.5092	.85368	.05137

Table B-4

Independent Samples Test

	Levene's test for equality of variances		*t*-test for equality of means						
								95% confidence interval of the difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Published books.									
Equal variances assumed	2.814	.094	-1.049	387	.295	-.09536	.09091	-.27410	.08337
Equal variances not assumed			-1.114	249.884	.266	-.09536	.08560	-.26396	.07323

Table B-5

Group Statistics

	19-your gender	N	Mean	Std. deviation	Std. error mean
Edited and translated books	Female/	116	.2414	.64093	.05951
	Male/	273	.3707	.81646	.04941

Table B-6

Independent Samples Test

	Levene's test for equality of variances		*t*-test for equality of means						
								95% confidence interval of the difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Edited and translated books.									
Equal variances assumed	4.573	.033	-1.166	387	.244	-.09928	.08517	-.26674	.06818
Equal variances not assumed			-1.284	273.323	.200	-.09928	.07735	-.25156	.05300

Table B-7

Group Statistics

	19-your gender	N	Mean	Std. deviation	Std. error mean
Published book chapters	Female/	116	.3190	.81932	.07607
	Male/	273	.4615	.95071	.05754

Table B-8

Independent Samples Test

	Levene's test for equality of variances		*t*-test for equality of means						
								95% confidence interval of the difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Published book chapters									
Equal variances assumed	4.620	.032	-1.408	387	.160	-.14257	.10126	-.34166	.05652
Equal variances not assumed			-1.495	249.675	.136	-.14257	.09538	-33043	.04258

One-way ANOVA

Difference in Research Productivity Among Marital Status Groups

Table B-9

ANOVA

Average Research Productivity

	Sum of squares	df	Mean square	F	Sig.
Between groups	.343	3	.114	.205	.893
Within groups	214.776	.385	.558		
Total	215.120	388			

Post Hoc Tests

Table B-10

Multiple Comparisons

Dependent variable: Average research productivity
Tukey HSD

(I) 20 Marital status	(J) 20 Marital status	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	Upper bound
Single/	Married/	-.13538	.21914	.926	-.7008	.4301
	Widowed/	-.27778	.37345	.879	-1.2414	.6858
	Divorced	.11111	.35522	.989	-1.0277	.8055
Married/	Single/	.13538	.21914	.926	-.4301	.7008
	Widowed/	-.14240	.30742	.967	-.9356	.6508
	Divorced/	.02427	.28500	.1.000	-.7111	.7597
Widowed/	Single/	.27778	.37345	.878	-.6858	'1.2414
	Married/	.14240	.30742	.967	-.6508	.9356
	Divorced/	.16667	.41554	.978	.-9055	1.2389
Divorced/	Single/	.11111	.35522	.989	-.8055	1.0277
	Married/	-.02427	.28500	1.000	-.7597	.7111
	Widowed/	-.16667	.41554	.978	-1.2389	.9055

Homogeneous Subsets

Table B-11

Overall Research Productivity

Tukey HSD[a,b]

20 Marital statuses/	*N*	Subset for alpha = 0.05 1
Single/	12	1.0556
Divorced/	7	1.1667
Married/	364	1.1909
Widowed/	6	1.3333
Sig.		.837

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 10.111.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-12

ANOVA

Articles in Refereed Journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	5.459	3	1.820	.880	.451
Within groups	795.703	.385	2.067		
Total	801.162	388			

Post Hoc Tests

Table B-13

Multiple Comparisons

Dependent variable: Articles in refereed journals
Tukey HSD

(I) 20 Marital status	(J) 20 Marital status	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Single/	Married/	-.24359	.42179	.939	-1.3319	.8448
	Widowed/	-1.00000	.71881	.506	-2.8547	.8547
	Divorced	.19048	.68373	.992	-1.5737	1.9547
Married/	Single/	.24359	.42179	.939	-.8448	1.3319
	Widowed/	-.75641	.59172	.577	-2.2832	.7704
	Divorced/	.43407	.54857	.858	-.9814	1.8495
Widowed/	Single/	1.00000	.71881	.506	-.8547	2.8547
	Married/	.75641	.59172	.577	-.7704	2.2832
	Divorced/	1.19048	.79982	.445	-.8733	3.2542
Divorced/	Single/	-.19048	.68373	.992	-1.9547	1.5737
	Married/	-.43407	.54857	.858	-1.8495	.9814
	Widowed/	-1.19048	.79982	.445	-3.2542	.8733

Table B-14

ANOVA

Published articles in professional journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	3.359	3	1.120	.454	.715
Within groups	950.168	385	2.468		
Total	953.527	388			

Post Hoc Tests

Table B-15

Multiple Comparisons

Dependent variable: Published articles in professional journals
Tukey HSD

(I) 20 Marital status	(J) 20 Marital status	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Single/	Married/	-.43498	.46092	.781	-1.6243	.7543
	Widowed/	-.25000	.78549	989	-2.2768	1.7768
	Divorced	-.79762	.74715	.710	-2.7255	1.1302
Married/	Single/	.43498	.46092	.781	-.7543	1.6243
	Widowed/	.18498	.64661	.992	-1.4835	1.8534
	Divorced/	-.36264	.59946	.930	-1.9094	1.1841
Widowed/	Single/	.25000	.78549	.989	-1.7768	2.2768
	Married/	-.18498	64661	.992	-1.8534	1.4835
	Divorced/	-.54762	.87401	.924	-2.8028	1.7076
Divorced/	Single/	.79762	.74715	.710	-1.1302	2.7255
	Married/	.36264	.59946	.930	-1.1841	1.9094
	Widowed/	.54762	.87401	.924	-1.7076	2.8028

Table B-16

Published articles in professional journals

Tukey HSD[a,b]

20 Marital statuses/	*N*	Subset for alpha = 0.05 1
Single/	12	.9167
Widowed/	6	1.1667
Married/	364	1.3516
Widowed/	6	1.7143
Sig.		.664

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 10.111.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-17

ANOVA

Published books

	Sum of squares	df	Mean square	F	Sig.
Between groups	1.407	3	.469	.695	.555
Within groups	259.699	385	.675		
Total	261.105	388			

Post Hoc Tests

Table B-18

Multiple Comparisons

Dependent variable: Published books
Tukey HSD

(I) 20 Marital status	(J) 20 Marital status	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Single/	Married/	-.23352	.24097	.767	-.8553	.3882
	Widowed/	-.58333	.41065	.487	-1.6429	.4763
	Divorced	.17857	.39061	.968	-1.1865	.8293
Married/	Single/	.23352	.24097	.767	-.3882	.8553
	Widowed/	-.34982	.33805	.729	-1.2221	.5224
	Divorced/	.05495	.31339	.998	-.7537	.8636
Widowed/	Single/	.58333	.41065	.487	-.4763	1.6429
	Married/	.34982	33805	.729	-.5224	1.2221
	Divorced/	.40476	.45693	812	-.7743	1.5838
Divorced/	Single/	.17857	.39061	.968	-.8293	1.1865
	Married/	-.05495	.31339	.998	-.8636	.7537
	Widowed/	-.40476	.45693	.812	-1.5838	.7743

Homogeneous Subsets

Table B-19

Published books

Tukey HSD[a,b]

20 Marital statuses/	*N*	Subset for alpha = 0.05 1
Single/	12	.2500
Widowed/	6	.4286
Married/	364	.4835
Widowed/	6	.8333
Sig.		.382

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 10.111.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-20

ANOVA

Edited and translated books

	Sum of squares	df	Mean square	F	Sig.
Between groups	.851	3	.284	.478	.698
Within groups	.228.511	385	.594		
Total	229.362	388			

Post Hoc Tests

Table B-21

Multiple Comparisons

Dependent variable: Edited and translated books
Tukey HSD

(I) 20 Marital status	(J) 20 Marital status	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Single/	Married/	-.14652	.22604	.916	-.7298	.4367
	Widowed/	.00000	.38521	1.000	-.9939	.9939
	Divorced	-.40476	.36640	.687	-1.3502	.5407
Married/	Single/	.14652	.22604	.916	-.4367	.7298
	Widowed/	.14652	.31710	.967	-.6717	.9647
	Divorced/	-.25824	.29398	.816	-1.0168	.5003
Widowed/	Single/	.00000	.38521	1.000	-.9939	.9939
	Married/	-.14652	.31710	.967	-.9647	.6717
	Divorced/	-.40476	.42862	.781	-1.5107	.7012
Divorced/	Single/	.40476	.36640	.687	-.5407	1.3502
	Married/	.25824	.29398	.816	-.5003	1.0168
	Widowed/	.40476	.42862	.781	-.7012	1.5107

Homogeneous Subsets

Table B-22

Edited and translated books

Tukey HSD[a,b]

		Subset for alpha = 0.05
20 Marital statuses/	*N*	1
Single/	12	.1667
Widowed/	6	.1667
Married/	364	.3132
Widowed/	6	.5714
Sig.		.639

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 10.111.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-23

ANOVA

Published book chapters

	Sum of squares	df	Mean square	F	Sig.
Between groups	1.125	3	.375	.446	.720
Within groups	.323.574	385	.840		
Total	.324.699	388			

Post Hoc Tests

Table B-24

Multiple Comparisons

Dependent variable: Published book chapters
Tukey HSD

(I) 20 Marital status	(J) 20 Marital status	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Single/	Married/	-.08150	.26897	.990	-.7755	.6125
	Widowed/	-.50000	.45838	.695	-1.6828	.6828
	Divorced	-.09524	.43601	.996	-1.2203	1.0298
Married/	Single/	.08150	.26897	.990	-.6125	.7755
	Widowed/	-.41850	.37734	.684	-1.3921	.5551
	Divorced/	-.01374	34982	1.000	-.9164	.8889
Widowed/	Single/	.50000	.45838	.695	-.6828	1.6828
	Married/	.41850	.37734	.684	-.5551	1.3921
	Divorced/	.40476	.51004	.857	-.9113	1.7208
Divorced/	Single/	.09524	.43601	.996	-1.0298	1.2203
	Married/	.01374	.34982	1.000	-.8889	.9164
	Widowed/	-.40476	.51004	.857	-1.7208	.9113

Homogeneous Subsets

Table B-25

Published book chapters

Tukey HSD[a,b]

20 Marital statuses/	*N*	Subset for alpha = 0.05 1
Single/	12	.3333
Widowed/	6	.4148
Married/	364	.4286
Widowed/	6	.8333
Sig.		.610

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 10.111.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-26

ANOVA

Papers presented at scientific conferences

	Sum of squares	df	Mean square	F	Sig.
Between groups	2.572	3	.857	.388	.762
Within groups	851.418	385	2.211		
Total	853.990	388			

Table B-27

Multiple Comparisons

Dependent variable: Papers presented at scientific conferences
Tukey HSD

(I) 20 Marital status	(J) 20 Marital status	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Single/	Married/	.32784	.43631	.876	-.7980	1.4536
	Widowed/	.66667	.74355	.807	-1.2519	2.5852
	Divorced	.61905	.70726	818	-1.2059	2.4440
Married/	Single/	-.32784	.43631	.876	-1.4536	.7980
	Widowed/	.33883	.61209	.946	-1.2405	1.9182
	Divorced/	.29121	.56745	.956	-1.1730	1.7554
Widowed/	Single/	-.66667	.74355	.807	-2.5852	1.2519
	Married/	.33883	.61209	.946	-1.9182	1.2405
	Divorced/	-.04762	.82735	1.000	-2.1824	2.0872
Divorced/	Single/	-.61905	.70726	.818	-2.4440	1.2059
	Married/	-.29121	.56745	.956	-1.7554	1.1730
	Widowed/	.04762	.82735	1.000	-2.0872	2.1824

Homogeneous Subsets

Table B-28

Papers presented at scientific conferences

Tukey HSD[a,b]

		Subset for alpha = 0.05
20 Marital statuses/	*N*	1
Widowed/	6	1.6667
Divorced/	7	1.7143
Married/	364	2.0055
Single/	12	2.3333
Sig.		.745

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 10.111.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Research Productivity Differences Among Age Groups

Table B-29

Descriptives

Overall

					95% confidence interval for mean			
	N	Mean	SD	Std. error	Lower Bound	Upper Bound	Min.	Max
2.00	97	.6082	.82357	.08362	.4423	.7742	.00	4.00
3.00	149	.8658	.85153	.06976	.7279	1.0036	.00	4.00
4.00	143	.8811	.74578	.06237	7578	1.0044	.00	4.00
Total	389	.8072	.81313	.04123	.7261	.8883	.00	4.00

Table B-30

Test of Homogeneity of Variances

Overall

Levene Statistic	df1	df2	Sig.
3.181	2	386	.043

Table B-31

ANOVA

Overall

	Sum of squares	df	Mean square	F	Sig.
Between groups	5.132	2	2.566	3.940	.020
Within groups	251.408	386	.651		
Total	256.540	388			

Table B-32

Robust Tests of Equality of Means

Overall

	Statistic[a]	df1	df2	Sig.
Welch	3.869	2	234.757	.022
Brown-Forsythe	3.923	2	347.599	.021

[a]Asymptotically F distributed.

Post Hoc Tests

Table B-33

Multiple Comparisons

Dependent variable: Overall
Tukey HSD

					95% confidence interval	
(I) Newage	(J) Newage	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
2.00	3.00	-.25752*	.10529	.039	-.5052	-.0098
	4.00	-.27287*	.10616	.028	-.5226	-.0231
3.00	2.00	.25752*	.10529	.039	.0098	.5052
	4.00	-.01535	.09448	.986	-.2376	.2069
4.00	2.00	.27287*	.10616	.028	.0231	.5226
	3.00	.01535	.09448	.986	-.2069	.2376

* The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-34

Overall

Tukey HSD[a]			
		Subset for alpha = 0.05	
Newage	*N*	1	2
2.00	97	.6082	
3.00	149		.8658
4.00	143		.8811
Sig.		1.000	.988

Note. Means for groups in homogeneous subsets are displayed.
[a]Uses Harmonic Mean Sample Size = 124.929.

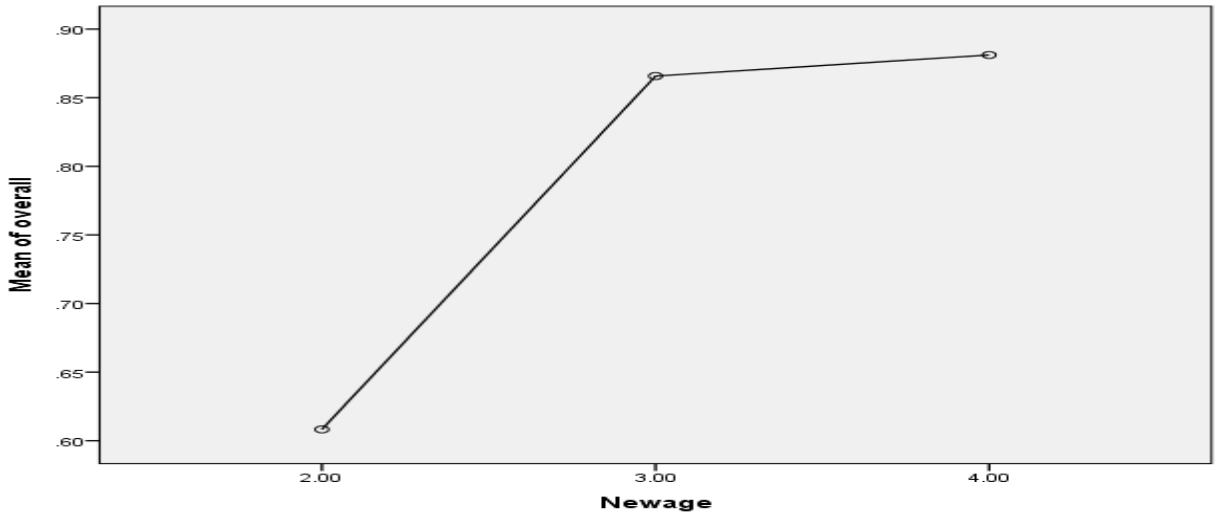


Table B-35

Descriptives

Papers presented at conferences								
					95% confidence interval for mean			
	N	Mean	SD	Std. error	Lower Bound	Upper Bound	Min.	Max
2.00	97	1.7423	1.45973	.14821	1.4481	2.0365	.00	4.00
3.00	149	2.1477	4.44435	.11833	1.9138	2.3815	.00	4.00
4.00	143	2.0350	1.52635	.12764	1.7826	2.2873	.00	4.00
Total	389	2.0051	1.48358	.07522	1.8573	2.1530	.00	4.00

Table B-36

Test of Homogeneity of Variances

Papers presented at conferences

Levene Statistic	df1	df2	Sig.
.482	2	386	.618

Table B-37

ANOVA

Papers presented at conferences

	Sum of squares	df	Mean square	F	Sig.
Between groups	9.856	2	4.928	2.253	.106
Within groups	844.134	386	2.187		
Total	853.990	388			

Table B-38

Robust Tests of Equality of Means

Papers presented at conferences

	Statistic[a]	df1	df2	Sig.
Welch	2.319	2	237.373	.101
Brown-Forsythe	2.261	2	357.783	.106

[a]Asymptotically F distributed.

Post Hoc Tests

Table B-39

Multiple Comparisons

Dependent variable: Papers presented at conferences
Tukey HSD

					95% confidence interval	
(I) Newage	(J) Newage	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
2.00	3.00	-.40538	.19293	.091	-.8593	.0485
	4.00	-.29270	.19452	.290	-.7504	.1650
3.00	2.00	.40538	.19293	.091	-.0485	.8593
	4.00	.11269	.17312	.792	-.2946	.5200
4.00	2.00	.29270	.19452	.290	-.1650	.7504
	3.00	-.11269	.17312	.792	-.5200	-.2946

Homogeneous Subsets

Table B-40

Papers presented at conferences

Tukey HSD[a,b]		
		Subset for alpha = 0.05
Newage	*N*	1
2.00	97	1.7423
3.00	149	2.0350
4.00	143	2.1477
Sig.		.078

Note. Means for groups in homogeneous subsets are displayed.
[a]Uses Harmonic Mean Sample Size = 124.929.
[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Means Plots

Table B- 41

Descriptives

Book chapters								
					95% confidence interval for mean			
	N	Mean	SD	Std. error	Lower Bound	Upper Bound	Min.	Max
2.00	97	.4021	.90898	.09229	.2189	.5853	.00	4.00
3.00	149	.3691	.85700	.07021	.2304	.5079	.00	4.00
4.00	143	4825	.97759	.08175	.3209	.6441	.00	4.00
Total	389	.4190	.91480	.04638	.3278	.5102	.00	4.00

Table B-42

Test of Homogeneity of Variances

Book chapters

Levene Statistic	df1	df2	Sig.
1.114	2	386	.329

Table B-43

ANOVA

Book chapters

	Sum of squares	df	Mean square	F	Sig.
Between groups	.975	2	.488	.581	.560
Within groups	323.724	386	.839		
Total	324.699	388			

Table B-44

Robust Tests of Equality of Means

Book chapters

	Statistic[a]	df1	df2	Sig.
Welch	.562	2	235.670	.571
Brown-Forsythe	.581	2	353.317	.560

[a]Asymptotically F distributed.

Post Hoc Tests

Table B-45

Multiple Comparisons

Dependent variable: Book chapters
Tukey HSD

					95% confidence interval	
(I) Newage	(J) Newage	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
2.00	3.00	.03293	.11948	.959	-.2482	.3140
	4.00	-.08046	.12046	.782	-.3639	.2030
3.00	2.00	-.03293	11948	959	-.3140	.2482
	4.00	-.11339	.10721	.541	-.3656	.1388
4.00	2.00	.08046	.12046	.782	-.2030	.3639
	3.00	.11339	.10721	.541	-.1388	.3656

Homogeneous Subsets

Table B-46

Book chapters

Tukey HSD[a]		
		Subset for alpha = 0.05
Newage	*N*	1
3.00	149	.3691
2.00	97	.4021
4.00	143	.4825
Sig.		.591

Note. Means for groups in homogeneous subsets are displayed.
[a]Uses Harmonic Mean Sample Size = 124.929.

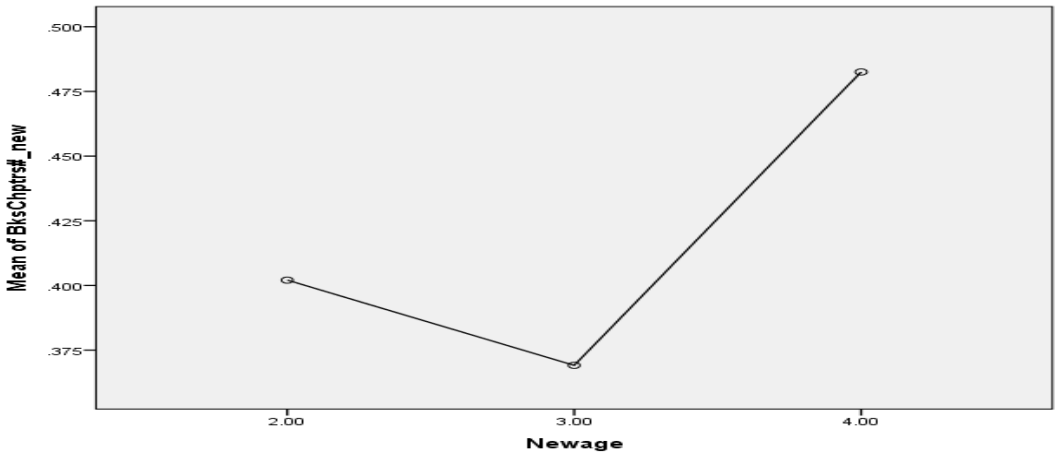


Table B-47

Descriptives

Translated and edited books								
					95% confidence interval for mean			
	N	Mean	SD	Std. error	Lower Bound	Upper Bound	Min.	Max
2.00	97	.2474	.72213	.07332	.1019	.3930	.00	4.00
3.00	149	.3490	.83768	.06863	.2134	.4846	.00	4.00
4.00	143	.3147	.72597	.06071	.1947	.4347	.00	4.00
Total	389	.3111	.76886	.03898	.2344	.3877	.00	4.00

Table B-48

Test of Homogeneity of Variances

Translated and edited books

Levene Statistic	df1	df2	Sig.
1.451	2	386	.235

Table B-49

ANOVA

Translated and edited books

	Sum of squares	df	Mean square	F	Sig.
Between groups	609	2	.305	.514	.599
Within groups	228.753	386	.593		
Total	229.362	388			

Table B-50

Robust Tests of Equality of Means

Translated and edited books

	Statistic[a]	df1	df2	Sig.
Welch	.524	2	240.746	.593
Brown-Forsythe	.526	2	367.698	.591

[a]Asymptotically F distributed.

Post Hoc Tests

Table B-51

Multiple Comparisons

Dependent variable: Translated and edited books
Tukey HSD

					95% confidence interval	
(I) Newage	(J) Newage	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
2.00	3.00	-.10157	.10043	.570	-.3379	.1347
	4.00	-.06726	.10126	.784	-.3055	.1710
3.00	2.00	.10157	.10043	.570	-.1347	.3379
	4.00	.03431	.09012	.923	-.1777	.2463
4.00	2.00	.06726	.10126	.784	-.1710	.3055
	3.00	-.03431	.09012	.923	-.2463	.1777

Homogeneous Subsets

Table B-52

Translated and edited books

Tukey HSD[a]		
		Subset for alpha = 0.05
Newage	*N*	1
2.00	97	.2474
4.00	143	.3147
3.00	149	.3490
Sig.		.550

Note. Means for groups in homogeneous subsets are displayed.
[a]Uses Harmonic Mean Sample Size = 124.929.

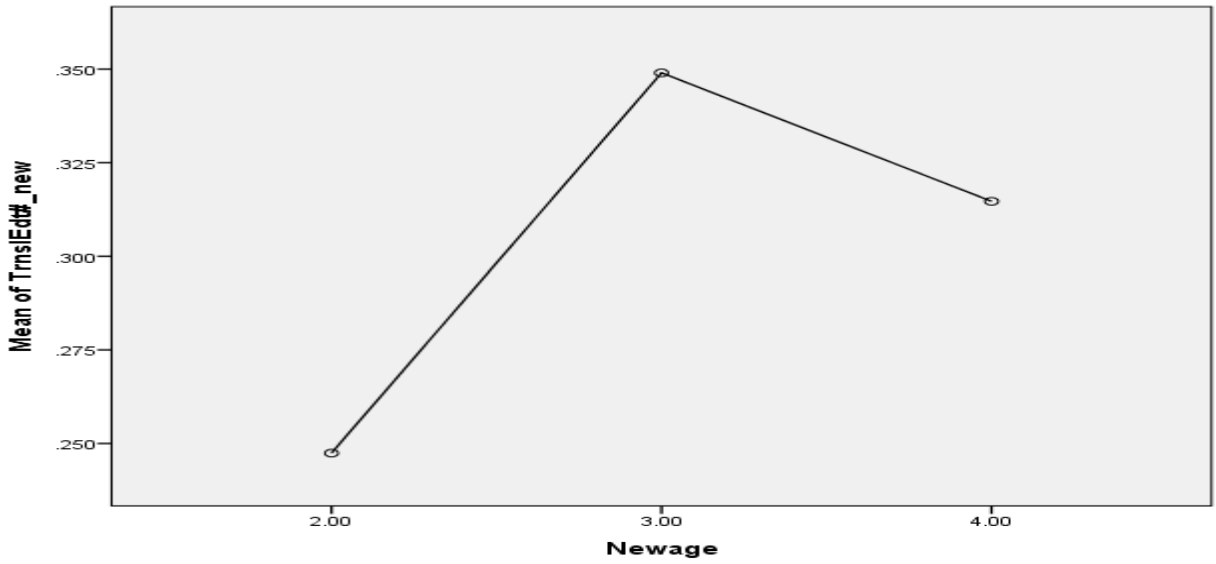


Table B-53

Descriptives

Books# new								
					95% confidence interval for mean			
	N	Mean	SD	Std. error	Lower Bound	Upper Bound	Min.	Max
2.00	97	.3196	.66999	.06803	.1846	.4546	.00	4.00
3.00	149	.4966	.83524	.06843	.3614	.6319	.00	4.00
4.00	143	.5734	.88405	.07393	.4273	.7196	.00	4.00
Total	389	.4807	.82034	.04159	.3989	.5625	.00	4.00

Table B-54

Test of Homogeneity of Variances

Books# new

Levene Statistic	df1	df2	Sig.
4.755	2	386	.009

Table B-55

ANOVA

Books# new

	Sum of squares	df	Mean square	F	Sig.
Between groups	3.785	2	1.893	2.839	.060
Within groups	257.320	386	.667		
Total	261.105	388			

Table B-56

Robust Tests of Equality of Means

Books# new

	Statistic[a]	df1	df2	Sig.
Welch	3.439	2	249.336	.034
Brown-Forsythe	3.000	2	383.102	.051

[a]Asymptotically F distributed.

Post Hoc Tests

Table B-57

Multiple Comparisons

Dependent variable: Books# new
Tukey HSD

					95% confidence interval	
(I) Newage	(J) Newage	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
2.00	3.00	-.17706	.10652	.221	-.4277	.0736
	4.00	-.25384*	.10740	.049	-.5065	-.0012
3.00	2.00	.17706	.10652	.221	-.0736	.4277
	4.00	-.07678	.09558	.701	-.3017	.1481
4.00	2.00	.25384*	.10740	.049	.0012	.5065
	3.00	.07678	.09558	.701	-.1481	.3017

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-58

Books# new

Tukey HSD[a]

Newage	*N*	Subset for alpha = 0.05 1	2
2.00	97	.3196	
3.00	149	.4966	.4966
4.00	143		.5734
Sig.		.201	.738

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 124.929.

Means Plots

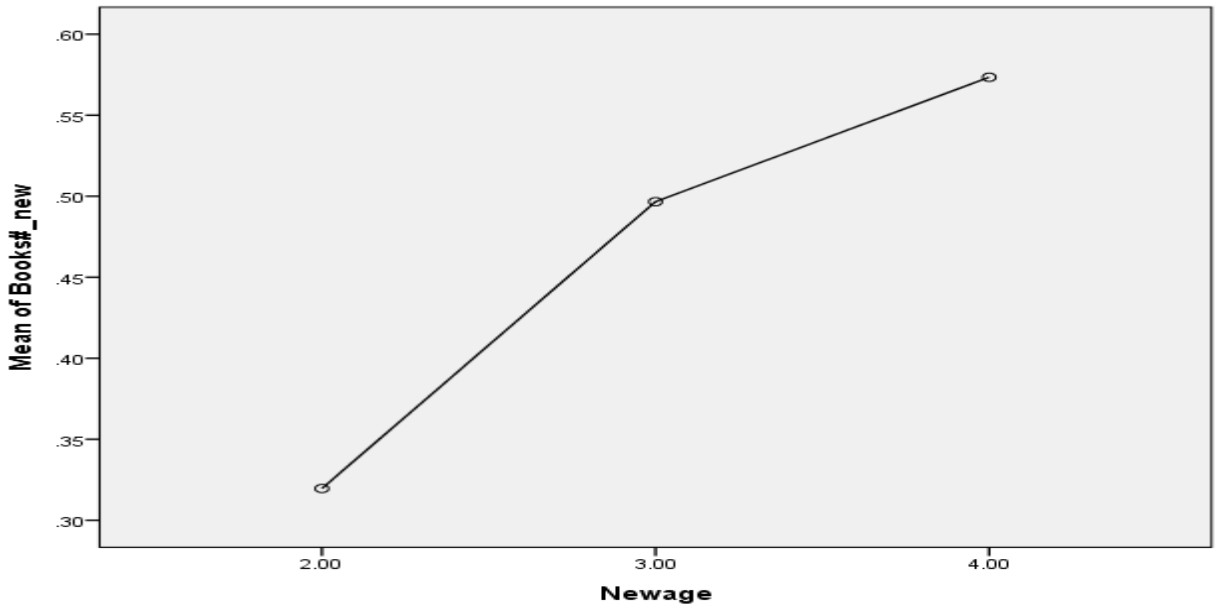


Table B-59

Descriptives

Professional articles

	N	Mean	SD	Std. error	95% confidence interval for mean Lower Bound	Upper Bound	Min.	Max
2.00	97	1.0103	1.38816	.14095	.7305	1.2901	.00	4.00
3.00	149	1.5503	1.67023	.13683	1.2799	1.8207	.00	4.00
4.00	143	1.3497	1.54400	.12912	1.0944	1.6049	.00	4.00
Total	389	1.3419	1.56766	.07948	1.1856	1.4982	.00	4.00

Table B-60

Test of Homogeneity of Variances

Professional articles# new

Levene Statistic	df1	df2	Sig.
9.504	2	386	.000

Table B-61

ANOVA

Professional articles

	Sum of squares	df	Mean square	F	Sig.
Between groups	17.147	2	8.574	3.534	.030
Within groups	936.380	386	2.426		
Total	953.527	388			

Table B-62

Robust Tests of Equality of Means

Professional articles

	Statistic[a]	df1	df2	Sig.
Welch	3.840	2	244.843	.023
Brown-Forsythe	3.668	2	378.052	.026

[a]Asymptotically F distributed.

Post Hoc Tests

Table B-63

Multiple Comparisons

Dependent variable: Professional articles
Tukey HSD

					95% confidence interval	
(I) Newage	(J) Newage	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
2.00	3.00	-.54003*	.20320	.022	-1.0181	-.0619
	4.00	-.33934	.20487	.224	-.8214	.1427
3.00	2.00	.54003*	.20320	.022	.0619	1.0181
	4.00	.20069	.18233	.514	-.2283	.6297
4.00	2.00	.33934	.20487	.224	-.1427	.8214
	3.00	-.20069	.18233	.514	-.6297	.2283

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-64

Professional articles

Tukey HSD[a]			
		Subset for alpha = 0.05	
Newage	*N*	1	2
2.00	97	1.0103	
4.00	143	1.3497	1.3497
4.00	143		1.5503
Sig.		.198	.566

Note. Means for groups in homogeneous subsets are displayed.
[a]Uses Harmonic Mean Sample Size = 124.929.

Means Plots

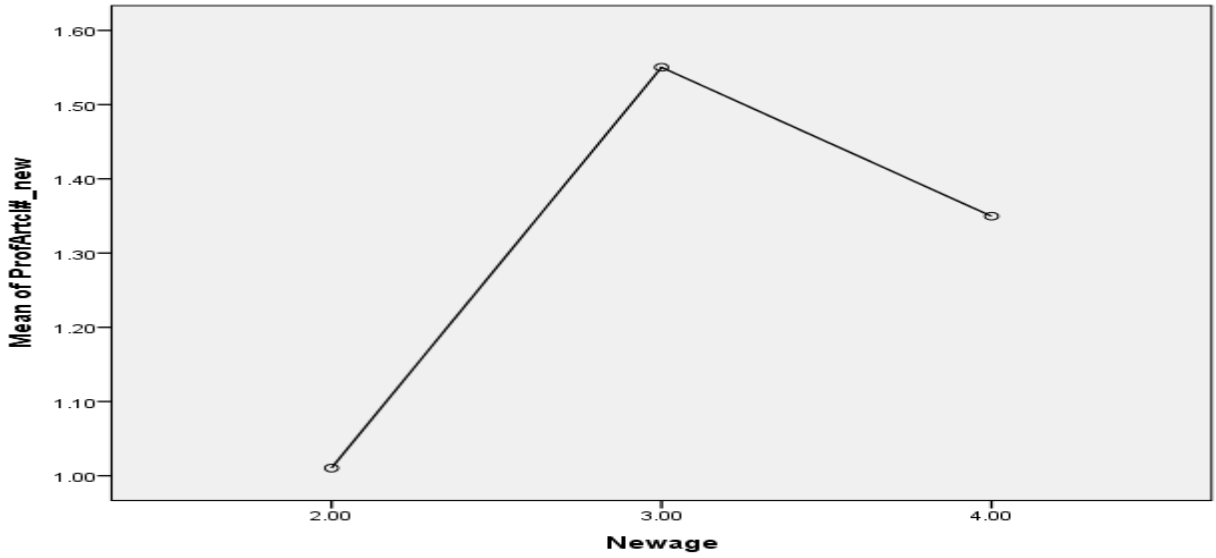


Table B-65

Descriptives

Published articles in refereed journals #new								
					95% confidence interval for mean			
	N	Mean	SD	Std. error	Lower Bound	Upper Bound	Min.	Max
2.00	97	2.0722	1.44516	.14673	1.7809	2.3634	.00	4.00
3.00	149	2.6309	1.46743	.12022	2.3933	2.8684	.00	4.00
4.00	143	2.8531	1.31598	.11005	2.6356	3.0707	.00	4.00
Total	389	2.5733	1.43696	.07286	2.4300	2.7165	.00	4.00

Table B-66

Test of Homogeneity of Variances

Published articles in refereed journal

Levene Statistic	df1	df2	Sig.
2.376	2	386	.094

Table B-67

ANOVA

Published articles in refereed journal

	Sum of squares	df	Mean square	F	Sig.
Between groups	36.053	2	18.027	9.094	.000
Within groups	765.109	386	1.982		
Total	801.162	388			

Table B-68

Robust Tests of Equality of Means

Published articles in refereed journals

	Statistic[a]	df1	df2	Sig.
Welch	9.117	2	234.605	.000
Brown-Forsythe	9.033	2	346.537	.000

Post Hoc Tests

Table B-69

Multiple Comparisons

Dependent variable: Published articles in refereed journals.
Tukey HSD

					95% confidence interval	
(I) Newage	(J) Newage	Mean difference (I-J)	Std. error	Sig.	Lower bound	Upper bound
2.00	3.00	-.55871*	.18368	.007	-.9909	-.1266
	4.00	-.78098*	.18519	.000	-1.2167	-.3453
3.00	2.00	.55871*	.18368	.007	.1266	.9909
	4.00	-.22227	.16482	.369	-.6101	.1655
4.00	2.00	.78098*	.18519	.000	.3453	1.2167
	3.00	.22227	.16482	.369	-.1655	.6101

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

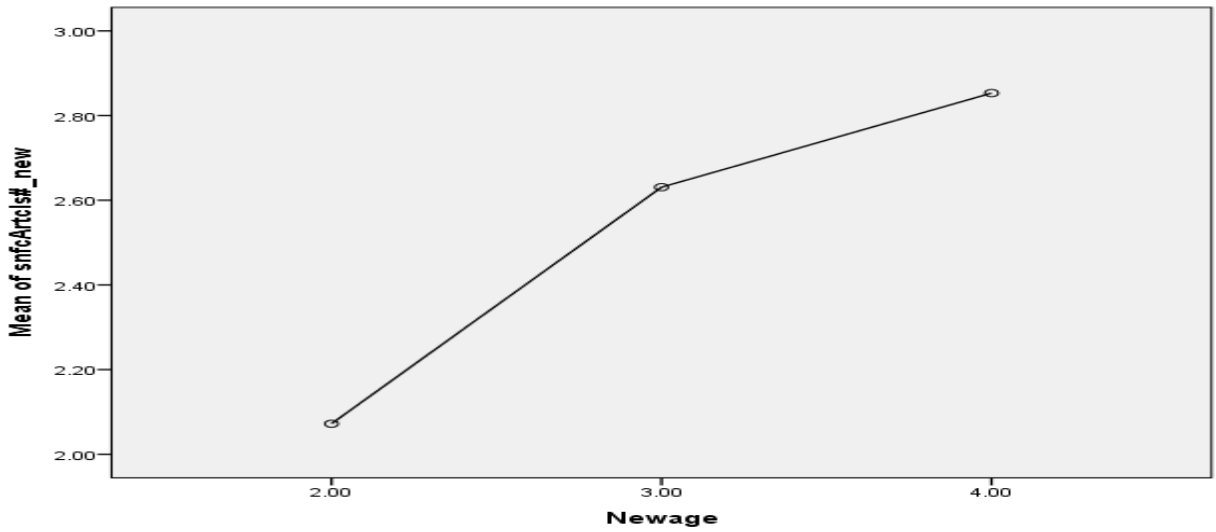
Table B-70

snfcArtcls# new

Tukey HSD[a,b]			
		Subset for alpha = 0.05	
Newage	*N*	1	2
2.00	97	2.0722	
3.00	149		2.6309
4.00	143		2.8531
Sig.		1.000	.426

Note. Means for groups in homogeneous subsets are displayed.
[a]Uses Harmonic Mean Sample Size = 124.929.
[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Means Plots



Research Differences Among Academic Rank Groups

Table B-71

ANOVA

Average research productivity

	Sum of squares	df	Mean square	F	Sig.
Between groups	48.386	2	24.193	56.009	.000
Within groups	166.734	386	.432		
Total	215.120	388			

Post Hoc Tests

Table B-72

Multiple Comparisons

Dependent variable: Average research productivity
Tukey HSD

(I) 23 Academic rank/	(J) 23 Academic rank/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Asst. Professor/	Assoc. Professor/	-.58234*	.07991	.000	-.7704	-.3943
	Professor/	-.80289*	.08189	.000	-.9956	-.6102
Assoc. Professor/	Asst. Professor/	.58234*	.07991	.000	.3943	.7704
	Professor/	-.22056*	.09121	.042	-.4352	-.0060
Professor/	Asst. Professor/	.80289*	.08189	.000	.6102	.9956
	Assoc. Professor/	.22056*	.09121	.042	.0060	.4352

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-73

Average research productivity

Tukey HSD[a]

23-Academic rank	*N*	Subset for alpha = 0.05 1	2	3
Asst. Professor	181	.8204		
Assoc. Professor	108		1.4028	
Professor/	100			1.6233
Sig.		1.000	1.000	1.000

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 121.045.

Table B-74

ANOVA

Articles in refereed journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	221.302	2	110.651	73.658	.000
Within groups	579.860	386	1.502		
Total	801.162	388			

Post Hoc Tests

Table B-75

Multiple Comparisons

Dependent variable: Articles in refereed journals

Tukey HSD

(I) 23 Academic rank/	(J) 23 Academic rank/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Asst. Professor/	Assoc. Professor/	-1.41723*	.14903	.000	-1.7679	-1.0666
	Professor/	-1.60204*	.15272	.000	-1.9614	-1.2427
Assoc. Professor/	Asst. Professor/	1.41723*	.14903	.000	1.0666	1.7679
	Professor/	-.18481	.17009	.523	-.5850	.2154
Professor/	Asst. Professor/	1.60204*	.15272	.000	1.2427	1.9614
	Assoc. Professor/	.18481	.17009	.523	-.2154	.5850

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-76

Articles in refereed journals

Tukey HSD[a,b]

23-Academic rank	*N*	Subset for alpha = 0.05 1	2
Asst. Professor	181	1.7680	
Assoc. Professor	108		3.1852
Professor/	100		3.3700
Sig.		1.000	.470

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 121.045.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-77

ANOVA

Published articles in professional journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	88.659	2	44.330	19.785	.000
Within groups	864.868	386	2.241		
Total	953.527	388			

Post Hoc Tests

Table B-78

Multiple Comparisons

Dependent variable: Public articles in professional journals

Tukey HSD

(I) 23 Academic rank/	(J) 23 Academic rank/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Asst. Professor/	Assoc. Professor/	-.81763*	.18200	.000	-1.2458	-.3894
	Professor/	-1.07022*	.18651	.000	-1.5090	-.6314
Assoc. Professor/	Asst. Professor/	.81763*	.18200	.000	.3894	1.2458
	Professor/	-.25259	.20773	.444	-.7413	.2362
Professor/	Asst. Professor/	1.07022*	.18651	.000	.6314	1.5090
	Assoc. Professor/	.25259	.20773	.444	-.2362	.7413

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-79

Published articles in professional journals

Tukey HSD

23-Academic rank	*N*	Subset for alpha = 0.05 1	2
Asst. Professor	181	.8398	
Assoc. Professor	108		1.6574
Professor/	100		1.9100
Sig.		1.000	.389

Note. Means for groups in homogeneous subsets are displayed.

Table B-80

ANOVA

Published books

	Sum of squares	df	Mean square	F	Sig.
Between groups	16.989	2	8.495	13.432	.000
Within groups	244.116	386	.632		
Total	261.105	388			

Post Hoc Tests

Table B-81

Multiple Comparisons

Dependent variable: Published books

Tukey HSD

(I) 23 Academic rank/	(J) 23 Academic rank/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Asst. Professor/	Assoc. Professor/	-.27005*	.09669	.015	-.4976	-.0426
	Professor/	-.50376*	.09909	.000	-.7369	-.2706
Assoc. Professor/	Asst. Professor/	.27005*	.09669	.015	.0426	.4976
	Professor/	-.23370	.11036	.088	-.4934	.0260
Professor/	Asst. Professor/	.50376*	.09909	.000	.2706	.7369
	Assoc. Professor/	.23370	.11036	.088	-.0260	.4934

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-82

Published books

Tukey HSD[a,b]

23-Academic rank	*N*	Subset for alpha = 0.05 1	2
Asst. Professor	181	.2762	
Assoc. Professor	108		.5463
Professor/	100		.7800
Sig.		1.000	.059

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 121.045.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table A-83

ANOVA

Edited and translated books

	Sum of squares	df	Mean square	F	Sig.
Between groups	3.099	2	1.550	2.644	.072
Within groups	226.263	386	.586		
Total	229.362	388			

Post Hoc Tests

Table B-84

Multiple Comparisons

Dependent variable: Edited and translated books

Tukey HSD

(I) 23 Academic rank/	(J) 23 Academic rank/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Asst. Professor/	Assoc. Professor/	-.17342	.09309	.151	-.3924	.0456
	Professor/	-.18453	.09540	.130	-.4090	.0399
Assoc. Professor/	Asst. Professor/	.17342	.09309	.151	-.0456	.3924
	Professor/	-.01111	.10625	.994	-.2611	.2389
Professor/	Asst. Professor/	.18453	.09540	.130	-.0399	.4090
	Assoc. Professor/	.01111	.10625	.994	-.2389	.2611

Homogeneous Subsets

Table B-85

Edited and translated books

Tukey HSD

23-Academic rank	*N*	Subset for alpha = 0.05 1
Asst. Professor	181	.2155
Assoc. Professor	108	.3889
Professor/	100	.4000
Sig.		.147

Note. Means for groups in homogeneous subsets are displayed.

Table B-86

ANOVA

Published book chapters

	Sum of squares	df	Mean square	F	Sig.
Between groups	6.997	2	3.498	4.250	.015
Within groups	317.703	386	.823		
Total	324.699	388			

Post Hoc Tests

Table B-87

Multiple Comparisons

Dependent variable: Published book chapters

Tukey HSD

(I) 23 Academic rank/	(J) 23 Academic rank/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Asst. Professor/	Assoc. Professor/	-.17567	.11031	.250	-.4352	.0839
	Professor/	-.32271*	.11304	.013	-.5887	-.0567
Assoc. Professor/	Asst. Professor/	.17567	.11031	.250	-.0839	.4352
	Professor/	-.14704	.12590	.473	-.4433	.1492
Professor/	Asst. Professor/	.3227l*	.11304	.013	.0567	.5887
	Assoc. Professor/	.14704	.12590	.473	-.1492	.4433

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-88

Published book chapters

Tukey HSD[a,b]

23-Academic rank	*N*	Subset for alpha = 0.05 1	2
Asst. Professor	181	.2873	
Assoc. Professor	108	.4630	.4630
Professor/	100		.6100
Sig.		.289	.418

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 121.045.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-89

ANOVA

Papers presented at scientific conferences

	Sum of squares	df	Mean square	F	Sig.
Between groups	87.206	2	43.603	21.950	.000
Within groups	766.784	386	1.986		
Total	853.990	388			

Post Hoc Tests

Table B-90

Multiple Comparisons

Dependent variable: Papers presented at scientific conferences

Tukey HSD

(I) 23 Academic rank/	(J) 23 Academic rank/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Asst. Professor/	Assoc. Professor/	-.64001*	.17137	.001	-1.0432	-.2368
	Professor/	-1.13409*	.17561	.000	-1.5473	-.7209
Assoc. Professor/	Asst. Professor/	.64001*	.17137	.001	.2368	1.0432
	Professor/	-.49407*	.19560	.032	-.9543	-.0339
Professor/	Asst. Professor/	1.13409*	.17561	.000	.7209	1.5473
	Assoc. Professor/	.49407*	.19560	.032	.0339	.9543

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-91

Papers presented at scientific conferences

Tukey HSD[a]

23-Academic rank	*N*	Subset for alpha = 0.05 1	2	3
Asst. Professor	181	1.5359		
Assoc. Professor	108		2.1759	
Professor/	100			2.6700
Sig.		1.000	1.000	1.000

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 121.045.

Research Differences Among Citizenship (Tenure Status) Groups

Table B-91

Differences in published articles in refereed journals by citizenship
Dependent variable: Articles in refereed journals
Tukey HSD

(I) 29 Region of citizenship/	(J) 29 Region of citizenship/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.29363	.16856	.303	-.7286	-.1413
	Asian/	-.44034	.31871	.512	-1.2627	.3820
	Westerner/	-.13125	.46241	.992	-1.3244	1.0619
Arab/	Saudi/	.29363	.16856	.303	-.1413	.7286
	Asian/	-.14671	.33751	.972	-1.0176	.7242
	Westerner/	.16238	.47556	.986	-1.0647	1.3895
Asian/	Saudi/	.44034	.31871	.512	-.3820	1.2627
	Arab/	.14671	.33751	.972	-.7242	1.0176
	Westerner/	.30909	.54710	.942	-1.1026	1.7208
Westerner/	Saudi	.13125	.46241	.992	-1.0619	1.3244
	Arab	-.16238	.47556	.986	-1.3895	1.0647
	Asian/	-.30909	.54710	.942	-1.7208	1.1026

Table B-92

Differences in published books by citizenship
Dependent variable: Published books
Tukey HSD

(I) 29 Region of citizenship/	(J) 29 Region of citizenship/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.17218	.09618	.280	-.4204	.0760
	Asian/	-.25994	.18186	.482	-.7292	.2093
	Westerner/	.02187	.26386	1.000	-.6590	.7027
Arab/	Saudi/	.17218	.09618	.280	-.0760	.4204
	Asian/	-.08776	.19259	.968	-.5847	.4092
	Westerner/	.19406	.27136	.891	-.5061	.8943
Asian/	Saudi/	.25994	.18186	.482	-.2093	.7292
	Arab/	.08776	.19259	.968	-.4092	.5847
	Westerner/	.28182	.31219	.803	-.5237	1.0874
Westerner/	Saudi	-.02187	.26386	1.000	-.7027	.6590
	Arab	-.19406	.27136	.891	-.8943	.5061
	Asian/	-.28182	.31219	.803	-1.0874	.5237

Table B-93

Differences in published books by citizenship
Dependent variable: Edited and translated books
Tukey HSD

(I) 29 Region of citizenship/	(J) 29 Region of citizenship/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.18147	.08967	.181	-.4128	.0499
	Asian/	-.35653	.16954	.154	-.7940	.0809
	Westerner/	-.36563	.24598	.447	-1.0003	.2691
Arab/	Saudi/	.18147	.08967	.181	-.0499	.4128
	Asian/	-.17507	.17954	.764	-.6383	.2882
	Westerner/	-.18416	.25298	.886	-.8369	.4686
Asian/	Saudi/	.35653	.16954	.154	-.0809	.7940
	Arab/	.17507	.17954	.764	-.2882	.6383
	Westerner/	-.00909	.29103	1.000	-.7600	.7419
Westerner/	Saudi	.36563	.24598	.447	-.2691	1.0003
	Arab	.18416	.25298	.886	-.4686	.8369
	Asian/	.00909	.29103	1.000	-.7419	.7600

Table B-94

Differences in papers presented at scientific conferences by citizenship
Dependent variable: Papers presented at scientific conferences
Tukey HSD

(I) 29 Region of citizenship/	(J) 29 Region of citizenship/	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.14588	.17468	.838	-.5966	.3048
	Asian/	-.04688	.33028	.999	-.8991	.8504
	Westerner/	-.44687	.47920	.787	-1.6833	.7896
Arab/	Saudi/	.14588	.17468	.838	-.3048	.5966
	Asian/	.09901	.34976	.992	-.8035	1.0015
	Westerner/	-.30099	.49283	.929	-1.5726	.9706
Asian/	Saudi/	.04688	.33028	.999	-.8054	.8991
	Arab/	-.09901	.34976	.992	-1.0015	.8035
	Westerner/	-4.0000	.56697	.895	-1.8629	1.0629
Westerner/	Saudi	.44687	.47920	.787	-.7896	1.6833
	Arab	.30099	.49283	.929	-.9706	1.5726
	Asian/	.40000	.56697	.895	-1.0629	1.8629

Research Differences Among Groups of Origin of PhD Degree

Table B-95

ANOVA

Average research productivity

	Sum of squares	df	Mean square	F	Sig.
Between groups	7.940	3	2.647	4.919	.002
Within groups	207.179	385	.538		
Total	215.120	388			

Post Hoc Tests

Table B-96

Multiple Comparisons

Dependent variable: Average research productivity

Tukey HSD

(I) 24 Origin of earned academic degree	(J) 24 Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Middle Eastern/	-.38403*	.12195	.010	-.6987	-.0694
	Asian/	-.41425	.16440	.058	-.8385	.0100
	Westerner/	-.31327*	.09399	.005	-.5558	-.0708
Middle Eastern/	Saudi/	.38403*	.12195	.010	.0694	.6987
	Asian/	-.03022	.17099	.998	-.4714	.4110
	Westerner/	.07076	.10509	.907	-.2004	.3419
Asian/	Saudi/	.41425	.16440	.058	.0100	.8385
	Middle Eastern/	.03022	.17099	.998	-.4110	.4714
	Westerner/	.10098	.15232	.911	-.2920	.4940
Westerner/	Saudi/	.31327*	.09399	.005	.0708	.5558
	Middle Eastern/	-.07076	.10509	.907	-.3419	.2004
	Asian/	-.10098	.15232	.911	-.4940	.2920

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-97

Average research productivity

Tukey HSD[a,b]

24 Origin of earned degree	*N*	Subset for alpha = 0.05 1	2
Saudi/	85	.9255	
Westerner/	215	1.2388	1.2388
Middle Eastern	63		1.3095
Asian	26		1.3397
Sig.		.107	.884

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 56.537.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-98

ANOVA

Articles in refereed journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	26.648	3	8.883	4.415	.005
Within groups	774.514	385	2.012		
Total	801.162	388			

Post Hoc Tests

Table B-99

Multiple Comparisons

Dependent variable: Articles in refereed journals

Tukey HSD

(I) 24 Origin of earned academic degree	(J) 24 Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Middle Eastern/	-.64015*	.23580	.035	-1.2486	-.0317
	Asian/	-.89412*	.31787	.026	-1.7143	-.0739
	Westerner/	-.54993*	.18173	.014	-1.0188	-.0810
Middle Eastern/	Saudi/	.64015*	.23580	.035	.0317	1.2486
	Asian/	-.25397	.33061	.869	-1.1070	.5991
	Westerner/	.09022	.20320	.971	-.4341	.6145
Asian/	Saudi/	.89412*	.31787	.026	.0739	1.7143
	Middle Eastern/	.25397	.33061	.869	-.5991	1.1070
	Westerner/	.34419	.29450	.647	-.4157	1.1041
Westerner/	Saudi/	.54993*	.18173	.014	.0810	1.0188
	Middle Eastern/	-.09022	.20320	.971	-.6145	.4341
	Asian/	-.34419	.29450	.647	-1.1041	.4157

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-100

Articles in refereed journals

Tukey HSD[a,b]

24 Origin of earned degree	*N*	Subset for alpha = 0.05 1	2
Saudi/	85	2.1059	
Westerner/	215	2.6558	2.6558
Middle Eastern	63	2.7460	2.7460
Asian	26		.30000
Sig.		.079	.570

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 56.537.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-101

ANOVA

Published articles in professional journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	35.640	3	11.880	4.983	.002
Within groups	917.887	385	2.384		
Total	953.527	388			

Post Hoc Tests

Table B-102

Multiple Comparisons

Dependent variable: Published articles in professional journals

Tukey HSD

(I) 24 Origin of earned academic degree	(J) 24 Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Middle Eastern/	-.94248*	.25669	.002	-1.6048	-.2801
	Asian/	-.74163	.34604	.141	-1.6345	.1513
	Westerner/	-.55075*	.19783	.029	-1.0612	-.0403
Middle Eastern/	Saudi/	.94248*	.25669	.002	.2801	1.6048
	Asian/	.20085	.35992	.944	-.7278	1.1295
	Westerner/	.39173	.22121	.289	-.1790	.9625
Asian/	Saudi/	.74163	.34604	.141	-.1513	1.6345
	Middle Eastern/	-.20085	.35992	.944	-1.1295	.7278
	Westerner/	.19088	.32060	.933	-.6364	1.0181
Westerner/	Saudi/	.55075*	.19783	.029	.0403	1.0612
	Middle Eastern/	-.39173	22121	.289	-.9625	.1790
	Asian/	-.19088	.32060	933	-1.0181	.6364

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-103

Published articles in professional journals

Tukey HSD[a,b]

24 Origin of earned degree	*N*	Subset for alpha = 0.05 1	2
Saudi/	85	.8353	
Westerner/	215	1.3860	1.3860
Asian	26	1.5769	1.5769
Middle Eastern	63		1.7778
Sig.		.054	.532

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 56.537.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-104

ANOVA

Published books

	Sum of squares	df	Mean square	F	Sig.
Between groups	.538	3	.179	.265	.850
Within groups	260.567	385	.677		
Total	261.105	388			

Post Hoc Tests

Table B-105

Multiple Comparisons

Dependent variable: Published books
Tukey HSD

(I) 24 Origin of earned academic degree	(J) 24 Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Middle Eastern/	-.12026	.13677	.816	-.4732	.2326
	Asian/	-.02624	.18437	.999	-.5020	.4495
	Westerner/	-.04378	.10540	.976	-.3158	.2282
Middle Eastern/	Saudi/	.12026	.13677	.816	-.2326	.4732
	Asian/	'.09402	.19176	.961	-.4008	.5888
	Westerner/	.07649	.11786	.916	-.2276	.3806
Asian/	Saudi/	.02624	.18437	.999	-.4495	.5020
	Middle Eastern/	-.09402	.19176	.961	-.5888	.4008
	Westerner/	-.01753	.17082	1.000	-.4583	.4232
Westerner/	Saudi/	.04378	.10541	.976	-.2282	.3158
	Middle Eastern/	-.07649	.11786	.916	-.3806	.2276
	Asian/	.01753	.17082	1.000	-.4232	.4583

Homogeneous Subsets

Table B-106

Published books

Tukey HSD[a,b]

24 Origin of earned degree	*N*	Subset for alpha = 0.05 1
Saudi/	85	.4353
Asian/	26	.4615
Westerner/	215	.4791
Middle Eastern	63	.5556
Sig.		.865

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 56.537.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-107

ANOVA

Edited and translated books

	Sum of squares	df	Mean square	F	Sig.
Between groups	1.205	3	.402	.678	.566
Within groups	228.157	385	.593		
Total	229.362	388			

Post Hoc Tests

Table B-108

Multiple Comparisons

Dependent variable: Edited and translated books

Tukey HSD

(I) 24 Origin of earned academic degree	(J) 24 Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Middle Eastern/	-.17330	.12798	.529	-.5035	.1569
	Asian/	-.04570	.17252	.993	.-4909	.3995
	Westerner/	-.10205	.09863	.729	-.3566	.1524
Middle Eastern/	Saudi/	.17330	.12798	.529	-.1569	.5035
	Asian/	.12759	.17944	.893	-.3354	.5906
	Westerner/	.07124	.11029	.917	-.2133	.3558
Asian/	Saudi/	.04570	.17252	.993	-.3995	.4909
	Middle Eastern/	-.12759	.17944	.893	-.5906	.3354
	Westerner/	-.05635	.15984	.985	-.4688	.3561
Westerner/	Saudi/	.10205	.09863	.729	-.1524	.3566
	Middle Eastern/	-.07124	.11029	.917	-.3558	.2133
	Asian/	.05635	.15984	.985	-.3561	.4688

Homogeneous Subsets

Table B-109

Edited and translated books

Tukey HSD[a,b]

24 Origin of earned degree	*N*	Subset for alpha = 0.05 1
Saudi/	85	.2235
Asian/	26	.2692
Westerner/	215	.3256
Middle Eastern	63	.3968
Sig.		.629

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 56.537.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-110

ANOVA

Published book chapters

	Sum of squares	df	Mean square	F	Sig.
Between groups	2.311	3	.770	.920	.431
Within groups	322.388	385	.837		
Total	324.699	388			

Post Hoc Tests

Table B-111

Multiple Comparisons

Dependent variable: Published book chapters

Tukey HSD

(I) 24 Origin of earned academic degree	(J) 24 Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Middle Eastern/	-.07974	.15213	.953	-.4723	.3128
	Asian/	-.32760	.20508	.381	-.8568	.2016
	Westerner/	-.03529	.11724	0.991	-.3378	.2672
Middle Eastern/	Saudi/	.07974	.15213	.953	-.3128	.2672
	Asian/	-.24786	.21330	.651	-.7982	.3025
	Westerner/	.04444	.13110	.987	-.2938	.3827
Asian/	Saudi/	.32760	.20508	.381	-.2016	.8568
	Middle Eastern/	.24786	.21330	.651	-.3025	.7982
	Westerner/	.29231	.19000	.416	-.1980	.7826
Westerner/	Saudi/	.03529	.11724	.991	-.2672	.3378
	Middle Eastern/	-.04444	.13110	.987	-.3827	.2938
	Asian/	-.29231	.19000	.416	-.7826	.1980

Homogeneous Subsets

Table B-112

Published book chapters

Tukey HSD[a,b]

24 Origin of earned degree	*N*	Subset for alpha = 0.05 1
Saudi/	85	.3647
Westerner/	215	.4000
Middle Eastern	63	.4444
Asian	26	.6923
Sig.		.228

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 56.537.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-113

ANOVA

Papers presented at scientific conferences

	Sum of squares	df	Mean square	F	Sig.
Between groups	22.136	3	7.379	3.415	.018
Within groups	831.854	385	2.161		
Total	853.990	388			

Post Hoc Tests

Table B-114

Multiple Comparisons

Dependent variable: Papers presented at scientific conferences

Tukey HSD

(I) 24 Origin of earned academic degree	(J) 24 Origin of earned academic degree	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Middle Eastern/	-.34827	.24437	.484	-.9788	.2823
	Asian/	-.45023	.32943	.521	-1.3002	.3998
	Westerner/	-.59781*	.18833	.009	-1.0838	-.1119
Middle Eastern/	Saudi/	.34827	.24437	.484	-.2823	.9788
	Asian/	-.10195	.34263	.991	-.9860	.7821
	Westerner/	-.24954	21058	.637	-.7929	.2938
Asian/	Saudi/	.45023	.32943	.521	-.3998	1.3002
	Middle Eastern/	.10195	.34263	.991	-.7821	.9860
	Westerner/	-.14758	.30521	.963	-.9351	.6399
Westerner/	Saudi/	.59781*	.18833	.009	.1119	1.0838
	Middle Eastern/	.24954	.21058	.637	-.2938	.7929
	Asian/	.14758	.30521	.963	-.6399	.9351

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-115

Papers presented at scientific conferences

Tukey HSD[a,b]

24 Origin of earned degree	*N*	Subset for alpha = 0.05 1
Saudi/	85	1.5882
Middle Eastern/	63	1.9365
Asian/	26	2.0835
Westerner	215	2.1860
Sig.		.136

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 56.537.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Research Differences Among Citizenship (Tenure Status) Groups

Table B-116

ANOVA

Overall research productivity

	Sum of squares	df	Mean square	F	Sig.
Between groups	7.186	3	2.395	4.435	.004
Within groups	207.934	385	.540		
Total	215.120	388			

Post Hoc Tests

Table B-117

Multiple Comparisons

Dependent variable: Average research productivity

Tukey HSD

(I) 29 Region of citizenship	(J) 29 Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.25608*	.08635	.017	-.4789	-.0333
	Asian/	-.40625	.16328	.063	-.8275	.0150
	Westerner/	-.20625	.23689	.820	-.8175	.4050
Arab/	Saudi/	.25608*	.08635	.017	.0333	.4789
	Asian/	-.15017	.17291	.821	-.5963	.2960
	Westerner/	.04983	.24363	.997	-.5788	.6785
Asian/	Saudi/	.40625	.16328	.063	-.0150	.8275
	Arab/	.15017	.17291	.821	-.2960	.5963
	Westerner/	.20000	.28028	.892	-.5232	.9232
Westerner/	Saudi/	.20625	.23689	.820	-.4050	.8175
	Arab/	-.04983	.24363	.997	-.6785	.5788
	Asian/	.20000	.28028	.892	-.9232	.5232

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-118

Average research productivity

Tukey HSD[a,b]

29 Region of citizenship	*N*	Subset for alpha = 0.05 1
Saudi/	256	1.0938
Westerner	10	1.3000
Arab/	101	1.3498
Asian	22	1.5000
Sig.		.206

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 25.116.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-119

ANOVA

Articles in refereed journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	8.897	3	2.966	1.441	.230
Within groups	792.265	385	2.058		
Total	215.120	388			

Post Hoc Tests

Table B-120

Multiple Comparisons

Dependent variable: Articles in refereed journals

Tukey HSD

(I) 29 Region of citizenship	(J) 29 Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.29363	.16856	.303	-.7286	.1413
	Asian/	-.44034	.31871	.512	-1.2627	.3820
	Westerner/	-.13125	.46241	.992	-1.3244	1.0619
Arab/	Saudi/	.29363	.16856	.303	-.1413	.7286
	Asian/	-.14671	.33751	.972	-1.0176	.7242
	Westerner/	.16238	.47556	.986	-1.0647	1.3895
Asian/	Saudi/	.44034	.31871	.512	-.3820	1.2627
	Arab/	.14671	.33751	.972	-.7242	1.0176
	Westerner/	.30909	.54710	.942	-1.1026	1.7208
Westerner/	Saudi/	.13125	.46241	.992	-1.0619	1.3244
	Arab/	-.16238	.47556	.986	-1.3895	1.0647
	Asian/	-.30909	.54710	.942	-1.7208	1.1026

Homogeneous Subsets

Table B-121

Articles in refereed journals

Tukey HSD[a,b]

29 Region of citizenship	*N*	Subset for alpha = 0.05 1
Saudi/	256	2.4688
Westerner	10	2.6000
Arab/	101	2.7624
Asian	22	2.9091
Sig.		.697

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 25.116.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-122

ANOVA

Published articles in professional journals

	Sum of squares	df	Mean square	F	Sig.
Between groups	33.598	3	11.199	4.687	.003
Within groups	909.929	385	2.389		
Total	953.527	388			

Post Hoc Tests

Table B-123

Multiple Comparisons

Dependent variable: Published articles in professional journals

Tukey HSD

(I) 29 Region of citizenship	(J) 29 Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.61394*	.18164	.004	-1.0826	-.1453
	Asian/	-.66974	.34343	.209	-1.5559	.2164
	Westerner/	.14844	.49827	.991	-1.1373	1.4341
Arab/	Saudi/	.61394*	.18164	.004	.1453	1.0826
	Asian/	-.05581	.36369	.999	-.9942	.8826
	Westerner/	.76238	.51245	.446	-.5599	2.0846
Asian/	Saudi/	.66974	.34343	.209	-.2164	1.5559
	Arab/	.05581	.36369	.999	-.8826	.9942
	Westerner/	.81818	.59854	.508	-.7030	2.3394
Westerner/	Saudi/	-.14844	.49827	.991	-1.4341	1.1373
	Arab/	-.76238	.51245	.446	-2.0846	.5599
	Asian/	-.81818	.58954	.508	-2.3394	.7030

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-124

Published articles in professional journals

Tukey HSD[a,b]

29 Region of citizenship	*N*	Subset for alpha = 0.05 1
Westernerr/	10	1.0000
Saudi/	256	1.1484
Arab/	101	1.7624
Asian	22	1.8182
Sig.		.240

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 25.116.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-125

ANOVA

Published books

	Sum of squares	df	Mean square	F	Sig.
Between groups	3.139	3	1.046	1.561	.198
Within groups	257.967	385	.670		
Total	261.105	388			

Post Hoc Tests

Table B-126

Multiple Comparisons

Dependent variable: Published books

Tukey HSD

(I) 29 Region of citizenship	(J) 29 Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.17218	.09618	.280	-.4204	.0760
	Asian/	-.25994	.18186	.482	-.7292	.2093
	Westerner/	.02187	.26386	1.000	-.6590	.7027
Arab/	Saudi/	.17218	.09618	.280	-.0760	.4204
	Asian/	-.08776	.19259	.968	-.5847	.4092
	Westerner/	.19406	.27136	.891	-.5061	.8943
Asian/	Saudi/	.25994	.18186	.482	-.2093	.7292
	Arab/	.08776	.19259	.968	-.4092	.5847
	Westerner/	.28182	.31219	.803	-.5237	1.0874
Westerner/	Saudi/	-.02187	.26386	1.000	-.7027	.6590
	Arab/	-.19406	.27136	.891	-.8943	.5061
	Asian/	-.28182	.31219	.803	-1.0874	.5237

Homogeneous Subsets

Table B-127

Published books

Tukey HSD[a,b]

29 Region of citizenship	*N*	Subset for alpha = 0.05 1
Westerner/	10	4.0000
Saudi/	256	.4219
Arab/	101	.5941
Asian	22	.6818
Sig.		.614

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 25.116.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-128

ANOVA

Edited and Translated books

	Sum of squares	df	Mean square	F	Sig.
Between groups	5.172	3	1.724	2.961	.032
Within groups	.224.190	385	.582		
Total	229.362	388			

Post Hoc Tests

Table B-129

Multiple Comparisons

Dependent variable: Edited and translated books

Tukey HSD

(I) 29 Region of citizenship	(J) 29 Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.18147	.08967	.181	-.4128	.0499
	Asian/	-.35653	.16954	.154	-.7940	.0809
	Westerner/	-.36563	.24598	.447	-1.0003	.2691
Arab/	Saudi/	.18147	.08967	.181	-.0499	.4128
	Asian/	-.17507	.17954	.764	-.6383	.2882
	Westerner/	-.18416	.25298	.886	-.8369	.4686
Asian/	Saudi/	.35653	.16954	.154	-.0809	.7940
	Arab/	.17507	.17954	.764	-.2882	.6383
	Westerner/	-.00909	.29103	1.000	-.7600	.7419
Westerner/	Saudi/	.36563	.24598	.447	-.2691	1.0003
	Arab/	.18416	.25298	.886	-.4686	.8369
	Asian/	.00909	.29103	1.000	-.7419	.7600

Homogeneous Subsets

Table B-130

Edited and translated books

Tukey HSD[a,b]

29 Region of citizenship	*N*	Subset for alpha = 0.05 1
Saudi	256	.2344
Arab/	101	.4158
Asian	22	.5909
Westerner	10	.6000
Sig.		.326

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 25.116.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-131

ANOVA

Published book chapters

	Sum of squares	df	Mean square	F	Sig.
Between groups	10.861	3	3.620	4.441	.004
Within groups	313.838	385	.815		
Total	324.699	388			

Post Hoc Test

Table B-132

Multiple Comparisons

Dependent variable: Published book chapters

Tukey HSD

(I) 29 Region of citizenship	(J) 29 Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.12941	.10609	.615	-.4032	.1443
	Asian/	-.66406*	.20059	.006	-1.1816	-.1465
	Westerner/	-.46406	.29103	.383	-1.2150	.2869
Arab/	Saudi/	.12941	.10609	.615	-.1443	.4032
	Asian/	-.53465	.21242	.059	-1.0828	.0135
	Westerner/	-.33465	.29931	.679	-1.1070	.4377
Asian/	Saudi/	.66406*	.20059	.006	.1465	1.1816
	Arab/	.53465	.21242	.059	-.0135	1.0828
	Westerner/	.20000	.34434	.938	-.6885	1.0885
Westerner/	Saudi/	.46406	.29103	.383	.2869	1.2150
	Arab/	.33465	.29931	.679	-.4377	1.1070
	Asian/	-.20000	.34434	.938	-1.0885	.6885

*The mean difference is significant at the 0.05 level.

Homogeneous Subsets

Table B-133

Published articles in professional journals

Tukey HSD[a,b]

29 Region of citizenship	*N*	Subset for alpha = 0.05 1	2
Saudi/	256	.3359	
Arab/	101	.4653	.4653
Westerner	10	.8000	.8000
Asian	22		1.0000
Sig.		0.265	.155

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 25.116.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Table B-134

ANOVA

Papers presented at scientific conferences

	Sum of squares	df	Mean square	F	Sig.
Between groups	3.142	3	1.047	.474	.701
Within groups	850.847	385	2.210		
Total	.853.990	388			

Post Hoc Tests

Table B-135

Multiple Comparisons

Dependent variable: Papers presented at scientific conferences

Tukey HSD

(I) 29 Region of citizenship	(J) 29 Region of citizenship	Mean difference (I-J)	Std. error	Sig.	95% confidence interval Lower bound	95% confidence interval Upper bound
Saudi/	Arab/	-.14588	.17468	.838	-.5966	.3048
	Asian/	-.04688	.33028	.999	-.8991	.8054
	Westerner/	-.44687	.47920	.787	-1.6833	.7896
Arab/	Saudi/	.14588	.17468	.838	-.3048	.5966
	Asian/	.09901	.34976	.992	-.8035	1.0015
	Westerner/	-.30099	.49283	.929	-1.5726	.9706
Asian/	Saudi/	.04688	.33028	.999	-.8054	.8991
	Arab/	-.09901	.34976	.992	-1.0015	.8035
	Westerner/	-.40000	.56697	.895	-1.8629	1.0629
Westerner/	Saudi/	.44687	.47920	.787	-.7896	1.6833
	Arab/	.30099	.49283	.929	-.9706	1.5726
	Asian/	.40000	.56697	.895	-1.0629	1.8629

Homogeneous Subsets

Table B-136

Papers presented at scientific conferences

Tukey HSD[a,b]

29 Region of citizenship	*N*	Subset for alpha = 0.05 1
Saudi/	256	1.9531
Asian/	22	2.0000
Arab	101	2.0990
Westerner	10	2.4000
Sig.		.711

Note. Means for groups in homogeneous subsets are displayed.

[a]Uses Harmonic Mean Sample Size = 25.116.

[b]The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Multiple Regression Models

Table B-137

Model Summary[b]

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.598[a]	.358	.303	.62385	1.973

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	76.015	30	2.534	6.510	.000[b]
	Residual	136.217	350	.389		
	Total	212.232	380			

[a]Dependent variable: Overall research productivity.

Table B-138

Coefficients[a]

Model		Unstandardized coefficients B	Unstandardized coefficients Std. error	Standardized coefficients Beta	*t*
1	(Constant)	.013	.508		.026
	Academic environment	.063	.052	.070	1.212
	Intellectual stimulation	.055	.057	.054	.967
	Working with opposite sex colleagues	-.032	.042	-.040	-.749
	Visiting scholars programs	.055	.042	.068	1.329
	Able to contribute to theoretical developments in discipline	-.035	.049	-.039	-.716
	Publishing in refereed journals	.009	.060	.009	.153
	Promotion system	-.031	.045	-.036	-.687
	Administrative procedures for research fund	.008	.049	.010	.163
	Financial incentives for scientific publication	-.077	.052	-.089	-1.502
	Research centers	-.111	.053	-.118	-2.108
	Publish in English language	.020	.059	.019	.335
	Academic freedom level	.031	.047	.034	.644
	Course release time	-.006	.060	-.006	-.103
	Research assistant	-.020	.073	-.014	-.270
	Research funds	.086	.096	.052	.896
	Sabbatical leave	-.050	.058	-.047	-.868
	Access to academic library	-.093	.093	-.059	-.990
	Access to computers	.044	.067	.038	.658
	Access to labs	.094	.075	.068	1.259

Table B-138 - Coefficients - continued

Model		Unstandardized coefficients		Standardized coefficients	
		B	Std. error	Beta	*t*
	Academic editing and translating services	.003	.049	.003	.069
	17-How many times have you participated in these programs since 2008 in your present university?	.099	.043	.108	2.300
	30. How many times do you attend scientific conferences and workshops per year?	.130	.036	.169	3.598
	32. What is your typical teaching load each semester (how many credit hours)?	-.055	.033	-.078	-1.658
	33. The weekly hours you spend in the administrative work; correcting exams, submitting degrees, etc.	.005	.027	.009	.186
	19-Your gender	.002	.084	.001	.025
	20-Marital status/	-.012	.097	-.006	-.127
	22-Which category below includes your age?	-.122	.044	-.147	-2.767
	23-Academic rank/	.434	.050	.481	8.697
	24-Origin of earned academic degree	.047	.028	.079	1.677
	29-Region of citizenship/	.198	.050	.191	3.989

[a]Dependent variable: Average research productivity

Table B-139

Residuals Statistics[a]

	Min.	Max.	Mean	SD	*N*
Predicted value	.1160	2.4339	1.1903	.44726	381
Residual	-1.18674	2.86414	.00000	.59872	381
Std. predicted value	-2.402	2.781	.000	1.000	381
Std. residual	-1.902	4.591	.000	.960	381

[a]Dependent variable: Average research productivity.

Table B-140

Model Summary[b]

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.605[a]	.366	.312	1.19374	2.065

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	288.359	30	9.612	6.745	.000[b]
	Residual	498.759	350	1.425		
	Total	787.118	380			

[a]Dependent variable: Overall research productivity.

Table B-141

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients	
		B	Std. error	Beta	*t*
1	(Constant)	.152	.971		.156
	Academic environment	.400	.099	.232	4.029
	Intellectual stimulation	-.061	.109	-.031	-.564
	Working with opposite sex colleagues	-.126	.081	-.082	-1.552
	Visiting scholars programs	.059	.080	.038	.737
	Able to contribute to theoretical developments in discipline	-.023	.094	-.013	-.241
	Publishing in refereed journals	.027	.115	.013	.236
	Promotion system	-.062	.087	-.037	-.720
	Administrative procedures for research fund	.049	.095	.032	.521
	Financial incentives for scientific publication	-.235	.099	-.141	-2.385
	Research centers	-.076	.101	-.042	-.747
	Publish in English language	.116	.113	.058	1.033
	Academic freedom level	.042	.091	.024	.464
	Course release time	-.123	.114	-.058	-1.083
	Research assistant	.260	.140	.098	1.857
	Research funds	.029	.184	.009	.160
	Sabbatical leave	-.169	.111	-.082	-1.520
	Access to academic library	.047	.179	.016	.263
	Access to computers	.159	.128	.071	1.246
	Access to labs	.271	.144	.102	1.889

Table B-141 - Coefficients - continued

Model		Unstandardized coefficients		Standardized coefficients	
		B	Std. error	Beta	*t*
	Academic editing and translating services	-.251	.094	-.131	-2.663
	17-How many times have you participated in these programs since 2008 in your present university?	.115	.082	.065	1.396
	30. How many times do you attend scientific conferences and workshops per year?	.039	.069	.026	.566
	32. What is your typical teaching load each semester (how many credit hours)?	-.020	.064	-.015	-.311
	33. The weekly hours you spend in the administrative work; correcting exams, submitting degrees, etc.	-.061	.051	-.054	-1.180
	19-Your gender	.096	.160	.031	.602
	20-Marital status/	-.292	.185	-.070	-1.578
	22-Which category below includes your age?	-.124	.084	-.078	-1.468
	23-Academic rank/	.806	.096	.463	8.432
	24-Origin of earned academic degree	.062	.054	.055	1.161
	29-Region of citizenship/	.179	.095	.090	1.886

[a]Dependent variable: Articles in refereed journals

Table B-142

Residuals Statistics[a]

	Min.	Max.	Mean	SD	*N*
Predicted value	.5573	4.6548	2.5748	.87111	381
Residual	-3.78906	2.92405	.00000	1.14565	381
Std. predicted value	-2.316	2.388	.000	1.000	381
Std. residual	-3.174	2.449	.000	.960	381

[a]Dependent variable: Articles in refereed journals

Table B-143

Coefficients[a,b]

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constant)	-1.482	1.204		-1.231	.219
	Academic environment	.042	.123	.022	.343	.732
	Intellectual stimulation	.303	.135	.140	2.246	.025
	Working with opposite sex colleagues	.003	.101	.002	.028	.978
	Visiting scholars programs	.052	.099	.030	.522	.602
	Able to contribute to theoretical developments in discipline	-.047	.117	-025	-.406	.685
	Publishing in refereed journals	.064	.142	.029	.452	.651
	Promotion system	-.119	.107	-.064	-1.105	.270
	Administrative procedures for research fund	-.124	.117	-.073	-1.061	.289
	Financial incentives for scientific publication	.027	.122	.015	.222	.825
	Research centers	-.070	.125	-.035	-.556	.579
	Publish in English language	.166	.140	.075	1.185	.237
	Academic freedom level	-.114	.112	-.060	-1.017	.310
	Course release time	.008	.141	.003	.055	.957
	Research assistant	-.061	.174	-.021	-.353	.724
	Research funds	.119	.228	.034	.521	.603
	Sabbatical leave	.039	.138	.017	.283	.777
	Access to academic library	-.070	.222	-.021	-.317	.752
	Access to computers	.095	.159	.039	.599	.549
	Access to labs	.185	.178	.063	1.037	.300
	Academic editing and translating services	-.091	.117	-.043	-.778	.437
	17-How many times have you participated in these programs since 2008 in your present university?	.051	.102	.026	.495	.621
	30. How many times do you attend scientific conferences and workshops per year?	.170	.086	.104	1.980	.049
	32. What is your typical teaching load each semester (how many credit hours)?	-.098	.079	-.066	1.241	.215
	33. The weekly hours you spend in the administrative work; correcting exams, submitting degrees, etc.	-.009	.064	-.008	-.148	.883
	19-Your gender	.046	.198	.013	.234	.815
	20-Marital status/	.164	.230	.036	.716	.475
	22-Which category below includes your age?	-.308	.105	-.176	-2.945	.003
	23-Academic rank/	.677	.118	.354	5.710	.000
	24-Origin of earned academic degree	.073	.067	.058	1.100	.272
	29-Region of citizenship/	.331	.118	.151	2.812	.005

[a]Dependent variable: Published articles in professional journals; [b]all requested variables entered.

Table B-144

Residuals Statistics[a]

	Min.	Max.	Mean	SD	*N*
Predicted value	-.4072	3.3039	1.3491	.68809	381
Residual	-2.76894	3.29752	.00000	1.42039	381
Std. predicted value	-2.552	2.841	.000	1.000	381
Std. residual	-1.871	2.228	.000	.960	381

[a]Dependent variable: Published articles in professional journals

Table B-145

Model Summary[b]

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.454[a]	.206	.138	.76383	1.914

[b]Dependent variable: Published books.

ANOVA[a]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	52.901	30	1.763	3.022	.000[b]
	Residual	204.201	350	.583		
	Total	257.102	380			

[a]Dependent variable: Published books.
Academic environment, administrative procedures for research fund.

Table B-146

Coefficients[a,b]

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constant)	.068	.622		.110	.912
	Academic environment	-.025	.063	-.025	-.390	.697
	Intellectual stimulation	.035	.070	.031	.508	.612
	Working with opposite sex colleagues	-.030	.052	-.034	-.575	.566
	Visiting scholars programs	-.027	.051	-.030	-.526	.599
	Able to contribute to theoretical developments in discipline	-.063	.060	-.062	-1.039	.300
	Publishing in refereed journals	.001	.073	.001	.008	.994
	Promotion system	-.096	.055	-.100	-1.736	.083
	Administrative procedures for research fund	.144	.060	.162	2.381	.018
	Financial incentives for scientific publication	-.037	.063	-.039	-.583	.560
	Research centers	-.179	.065	-.173	-2.768	.006
	Publish in English language	-.066	.072	-.057	-.914	.361
	Academic freedom level	.043	.058	.044	.748	.455
	Course release time	.022	.073	.018	.300	.764
	Research assistant	-.125	.090	-.082	-1.398	.163
	Research funds	.071	.118	.038	.601	.549
	Sabbatical leave	-.052	.071	-.044	-.734	.464
	Access to academic library	-.117	.114	-.068	-1.026	.306
	Access to computers	-.011	.082	'-.008	-.130	.897
	Access to labs	.035	.092	.023	.383	.702
	Academic editing and translating services	.190	.060	.173	3.152	.002
	17-How many times have you participated in these programs since 2008 in your present university?	.132	.'.053	.131	2.508	.013
	30. How many times do you attend scientific conferences and workshops per year?	.130	.044	.153	2.941	.003
	32. What is your typical teaching load each semester (how many credit hours)?	-.012	.041	-.015	-.286	.775
	33. The weekly hours you spend in the administrative work; correcting exams, submitting degrees, etc.	.049	.033	.076	1.480	.140
	19-Your gender	.030	.102	.017	.296	.767
	20-Marital status/	.070	.118	.029	.591	.555
	22-Which category below includes your age?	-.012	.054	-.014	-.231	.817
	23-Academic rank/	.269	.061	.270	4.400	.000
	24-Origin of earned academic degree	-.016	.034	-.025	-.473	.636
	29-Region of citizenship/	.087	.061	.076	1.428	.154

[a]Dependent variable: Published books

Table B-147

Residuals Statistics[a]

	Min.	Max.	Mean	SD	*N*
Predicted value	-.4088	1.6414	.4803	.37311	381
Residual	-1.28268	3.39334	.00000	.733606	381
Std. predicted value	-2.383	3.112	.000	1.000	381
Std. residual	-1.679	4.443	.000	.960	381

[a]Dependent variable: Published books

Table B-148

Model Summary[b]

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.379[a]	.144	.070	.74724	1.907

Research funds, academic environment, administrative procedures for research fund

[b]Dependent variable: Edited and translated books.

ANOVA[a]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	32.775	30	1.093	1.957	.002[b]
	Residual	.195.430	350	.558		
	Total	228.205	380			

[a]Dependent variable: Edited and translated books.

Administrative procedures for research fund

Table B-149

Coefficients[a,b]

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constant)	.068	.622		.110	.912
	Academic environment	-.025	.063	-.025	-.390	.697
	Intellectual stimulation	.035	.070	.031	.508	.612
	Working with opposite sex colleagues	-.030	.052	-.034	-.575	.566
	Visiting scholars programs	-.027	.051	-.030	-.526	.599
	Able to contribute to theoretical developments in discipline	-.063	.060	-.062	-1.039	.300
	Publishing in refereed journals	.001	.073	.001	.008	.994
	Promotion system	-.096	.055	-.100	-1.736	.083
	Administrative procedures for research fund	.144	.060	.162	2.381	.018
	Financial incentives for scientific publication	-.037	.063	-.039	-.583	.560
	Research centers	-.179	.065	-.173	-2.768	.006
	Publish in English language	-.066	.072	-.057	-.914	.361
	Academic freedom level	.043	.058	.044	.748	.455
	Course release time	.022	.073	.018	.300	.764
	Research assistant	-.125	.090	-.082	-1.398	.163
	Research funds	.071	.118	.038	.601	.549
	Sabbatical leave	-.052	.071	-.044	-.734	.464
	Access to academic library	-.117	.114	-.068	-1.026	.306
	Access to computers	-.011	.082	'-.008	-.130	.897
	Access to labs	.035	.092	.023	.383	.702
	Academic editing and translating services	.190	.060	.173	3.152	.002
	17-How many times have you participated in these programs since 2008 in your present university?	.132	.'.053	.131	2.508	.013
	30. How many times do you attend scientific conferences and workshops per year?	.130	.044	.153	2.941	.003
	32. What is your typical teaching load each semester (how many credit hours)?	-.012	.041	-.015	-.286	.775
	33. The weekly hours you spend in the administrative work; correcting exams, submitting degrees, etc.	.049	.033	.076	1.480	.140
	19-Your gender	.030	.102	.017	.296	.767
	20-Marital status/	.070	.118	.029	.591	.555
	22-Which category below includes your age?	-.012	.054	-.014	-.231	.817
	23-Academic rank/	.269	.061	.270	4.400	.000
	24-Origin of earned academic degree	-.016	.034	-.025	-.473	.636
	29-Region of citizenship/	.087	.061	.076	1.428	.154

[a]Dependent variable: Published books

Table B-150

Residuals Statistics[a]

	Min.	Max.	Mean	SD	*N*
Predicted value	-.3719	1.3826	.3150	.29368	381
Residual	-1.09354	3.48382	.00000	.71714	381
Std. predicted value	-2.339	3.635	.000	1.000	381
Std. residual	-1.463	4.662	.000	.960	381

[a]Dependent variable: Edited and translated books

a. Dependent variable: Published book chapters
b. All requested variables entered

Table B-151

Model Summary[b]

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.367[a]	.134	.060	.89090	2.030

bDependent variable: Published book chapters

ANOVA[a]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	43.167	30	1.439	1.813	.007[b]
	Residual	277.799	350	.794		
	Total	320.966	380			

[a]Dependent variable: Published book chapters

Table B-152
Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constant)	-.473	.725		-.652	.515
	Academic environment	.005	.074	.005	.072	.942
	Intellectual stimulation	-.068	.081	-.054	-.833	.405
	Working with opposite sex colleagues	-.007	.061	-.007	-.109	.913
	Visiting scholars programs	.074	.060	.074	1.244	.214
	Able to contribute to theoretical developments in discipline	.009	.070	.008	.121	.904
	Publishing in refereed journals	.001	.086	.001	.013	.990
	Promotion system	.016	.065	.015	.251	.802
	Administrative procedures for research fund	.084	.071	.084	1.187	.236
	Financial incentives for scientific publication	-.040	.074	-.037	-.539	.590
	Research centers	-.176	.076	-.152	-2.327	.021
	Publish in English language	-.127	.084	-.099	1.515	.131
	Academic freedom level	.097	.068	.087	1.430	.154
	Course release time	.042	.085	.031	.498	618
	Research assistant	-.043	.105	-.025	-.408	.683
	Research funds	.253	.137	.123	1.839	.067
	Sabbatical leave	-.007	.083	-.005	-.081	.936
	Access to academic library	-.360	.133	-.186	-2.693	.007
	Access to computers	.078	.095	.055	.819	.413
	Access to labs	.097	.107	.057	.905	.366
	Academic editing and translating services	.099	.070	.080	1.399	.163
	17-How many times have you participated in these programs since 2008 in your present university?	.127	.061	.112	2.065	.040
	30. How many times do you attend scientific conferences and workshops per year?	.089	.052	.093	1.712	.088
	32. What is your typical teaching load each semester (how many credit hours)?	-.036	.048	-.041	-.745	.457
	33. The weekly hours you spend in the administrative work; correcting exams, submitting degrees, etc.	.008	.038	.012	.215	.830
	19-Your gender	-.021	.119	-.010	-.173	.863
	20-Marital status/	.044	.138	.016	.318	.750
	22-Which category below includes your age?	-.048	.063	-.047	-.766	.444
	23-Academic rank/	.162	.071	.146	2.276	.023
	24-Origin of earned academic degree	-.005	.040	-.007	-.120	.904
	29-Region of citizenship/	.212	.071	.167	2.997	.003

[a]Dependent variable: Published book chapters

Table B-153

Residuals Statistics[a]

	Min.	Max.	Mean	SD	*N*
Predicted value	-.4080	1.6652	.4226	.33704	381
Residual	-1.36515	3.75194	.00000	.85501	381
Std. predicted value	-2.464	3.687	.000	1.000	381
Std. residual	-1.532	4.211	.000	.960	381

[a]Dependent variable: Published book chapters

a. Dependent variable: Papers presented at scientific conferences
b. All requested variables entered

Table B-154

Model Summary[b]

Model	R	R square	Adjusted R square	Std. error of the estimate	Durbin-Watson
1	.475[a]	.225	.159	1.36021	2.070

bDependent variable: Papers presented at scientific conferences

ANOVA[a]

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	188.443	30	6.281	3.398	.000[b]
	Residual	647.557	350	1.850		
	Total	836.300	380			

[a]Dependent variable: Papers presented at scientific conferences

Table B-155
Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. error	Beta	t	Sig.
1	(Constant)	.890	1.107		.804	.422
	Academic environment	.034	.113	.019	.305	.760
	Intellectual stimulation	.080	.124	.039	.649	.517
	Working with opposite sex colleagues	-.044	.093	-.028	-.479	.632
	Visiting scholars programs	.084	.091	.052	.920	.358
	Able to contribute to theoretical developments in discipline	.001	.107	.001	.012	.991
	Publishing in refereed journals	.051	.131	.024	.389	.698
	Promotion system	.125	.099	.072	1.268	.206
	Administrative procedures for research fund	-.173	.108	-.108	-1.608	.109
	Financial incentives for scientific publication	-.079	.112	-.046	-.704	.482
	Research centers	-.099	.115	-.053	-.856	.393
	Publish in English language	-.021	.128	-.010	-.164	.870
	Academic freedom level	.053	.103	.030	.513	.608
	Course release time	-.061	.130	-.028	-.471	.638
	Research assistant	-.017	.160	-.006	-.106	.916
	Research funds	.135	.210	.041	.645	.519
	Sabbatical leave	-.155	.126	-.073	-1.228	.220
	Access to academic library	.130	.204	.042	.639	.524
	Access to computers	.051	.146	.022	.347	.729
	Access to labs	-.032	.164	-.012	-.195	.846
	Academic editing and translating services	-.074	.107	-.037	-.687	.492
	17-How many times have you participated in these programs since 2008 in your present university?	.127	.061	.112	2.065	.040
	30. How many times do you attend scientific conferences and workshops per year?	.306	.079	.200	3.877	.000
	32. What is your typical teaching load each semester (how many credit hours)?	-.119	.073	-.085	-1.639	.102
	33. The weekly hours you spend in the administrative work; correcting exams, submitting degrees, etc.	.040	.058	.034	.677	.499
	19-Your gender	-.169	.182	-.052	-.928	.354
	20-Marital status/	-.245	.211	-.057	-1.160	.247
	22-Which category below includes your age?	-.225	.096	-.137	-2.337	.020
	23-Academic rank/	.570	.109	.318	5.234	.009
	24-Origin of earned academic degree	.161	.061	.137	2.632	.009
	29-Region of citizenship/	.210	.108	.102	1.944	.053

[a]Dependent variable: Papers presented at scientific conferences

Table B-156

Residuals Statistics[a]

	Min.	Max.	Mean	SD	*N*
Predicted value	.1782	4.0557	2.0000	.70420	381
Residual	-3.93235	2.87105	.00000	1.30541	381
Std. predicted value	-2.587	2.919	.000	1.000	381
Std. residual	-2.891	2.111	.000	.960	381

[a]Dependent variable: Papers presented at scientific conferences

Vita

Abad Nasser Alzuman was born and raised in Saudi Arabia. In 1999, she received her B.A. in English Language from Al-Majmaa'a University, Saudi Arabia. In 2003, she received her Master's degree in Health and Hospital Administration from King Saud University, Saudi Arabia. After graduation, she worked as a Chief Training Specialist at the Academic Affairs Department in King Fahd Medical City at Riyadh, Saudi Arabia. In 2009, she was granted a full scholarship to pursue graduate studies in the United States through the King Abdullah Scholarship Program. In August of 2009, she joined the PhD program at the L. Wilder School of Government and Public Affairs at Virginia Commonwealth University. In Fall 2015, she was awarded the degree of Doctor of Philosophy in Public Policy and Administration.