IMPACT OF INDIVIDUAL AND INSTITUTIONAL FACTORS ON THE FACULTY RESEARCH PRODUCTIVITY AT PRINCESS NOURAH BINT ABDULRAHMAN UNIVERSITY, RIYADH

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ABSTRACT

Background: *Faculty Research is the most important criteria for the ranking of any university conducted by the world's universities ranking systems. Universities across the globe are taking many initiatives to promote the research culture among their academic staff.*

Research Problem: *Saudi universities have low research productivity due to their limited publication output. Al-Khalifa (2014) investigated the bibliometric studies of Saudi researchers. He discussed the low number of publications by Saudi universities and low impact factors. He stated that the production of scientific research, high quality research published in referred international academic journals and indexed in international research databases is considered poor compared to most countries in the Middle East. Saudi universities rank the lowest among other developing countries in terms of their number of publications. Further, the roles of academics in institutions of higher education are becoming more complex because academics have more responsibilities in teaching, research, and service than ever before (Krause, 2019).*

Research Purpose: *The purpose of present study was to identify the significant association between the individual and institutional factors and the faculty research productivity in Princess Nourah Bint Abdulrahman University, Riyadh.*

Material and Methods: *This study was designed as a longitudinal trend study. The period of study was set from 2010-2020. The population of study included the faculty of Princess Nourah Bint Abdulrahman University, Riyadh. Descriptive statistics i.e. frequencies and percentages have been used to analyze the faculty demographics. Independent sample t-test was used to interpret the data. Recommendations were included at the end of the research.*

Research Significance: *This study is helpful in identifying the significant factors affecting the faculty research productivity at Princess Nourah Bint Abdulrahman University, Riyadh. The findings will help the scientific research department and the research centres to build an appropriate research policy and a strategic research development program to support the research productivity of academic staff.*

Keywords: Faculty research productivity; Research culture; Individual and institutional factors; Research policy; Research output; Research publications.

INTRODUCTION

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Sustainability and ranking of any university depends not only on faculty teaching quality, but also on their research productivity. Faculty research publications act as a tool to accelerate the university ranking. High quality of research productivity enhances the prestige and reputation of a university nationally and internationally. The research productivity of academics is important for faculty in their career development and for the universities. Every university expects teachers to deliver high quality research and to publish articles, along with their teaching role. Ministry of Higher Education in KSA has invested huge amounts of money in the development of research in universities. Princess Nourah Bint Abdulrahman University, represented by the Deanship of Scientific Research, sought to raise the indicators of scientific publication registered in the name of Princess Nourah Bint Abdulrahman University by encouraging female researchers to engage in scientific research and distinguish them at the local and international levels, since the establishment of the Deanship of Research. Princess Nourah Bint Abdulrahman University was the first to launch the Fast Track Program for Research Funding in 2019 with procedural facilities and huge financial resources. The deanship of Scientific Research made some action plans such as: (1) the creation of the Elite Research Program (Tamayouz), which aims to publish in WOS in journals with a high impact factor Q1-Q2, which will achieve the quality in addition to allowing each researcher to apply 10 times, which guarantees the achievement of the quantity. (2) Circulating announcements to the deans of colleges and research centers. (3) Launching the initiative to market the research output for female researchers, whereby the researcher sends a classified research abstract and uploads it to the media. To promote female researchers, the Deanship is also encouraging acceptance of research proposals for development and advancement of the field. The Deanship of Scientific Research has created a parallel program that helps to increase the number receiving applications from male and female researchers, which is the Elite Research Program (Tamayouz), where male and female researchers are allowed to apply with ten research papers. The research productivity of academic staff in Princess Nourah Bint Abdulrahman University, Riyadh is examined during 2010-2020. The present study attempts to identify the prominent factors that affects faculty research productivity and proposes to develop an action plan which can be implemented by the policy makers, educators and administrators across the globe to enhance research activities and achieve the research targets of the university.

Research Objectives

1. To measure the research productivity of faculty in Princess Nourah Bint Abdulrahman University from 2010-2020.
2. To examine the impact of individual and institutional factors on the faculty research productivity at Princess Nourah Bint Abdulrahman University.
3. To suggest action plan for research development at Princess Nourah Bint Abdulrahman University.

LITERATURE REVIEW

Concept of Research Productivity

There is no single definition for RP, and various criteria have been applied for categorizing the wide array of research outputs (Abramo et al., 2010; Sridhar et al., 2010).

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However, the number of publications in peer-reviewed academic journals and scholarly books typically defines RP (Sridhar et al., 2010).

Factors Affecting Research Productivity

From the critical review of literature it was found that the factors affecting research productivity can be categorized as Individual Factors and Institutional Factors.

Individual factors

Educational qualification

According to Bailey (1999), academics with a higher degree are more committed to research and more self-efficacious about their competence in terms of research problems than are others. Similarly, doctorate-holders are usually more productive than their colleagues who hold a master's degree (Smeby & Try, 2005). Smeby and Try (2005) and Perry et al. (2000) found that educational qualification to be positively correlated with the research productivity of academics in all reviewed studies. Rodgers and Neri (2007) even discovered that the most productive time of an academic's career is the first five years after they are conferred a doctoral degree.

Academic rank and tenure

Studies have found a positive correlation between the rank of academics and their research productivity. Academic rank and tenure are also related to research productivity according to the literature. For example, faculty members who are in the higher professorial ranks have larger publication. Tien and Blackburn (1996) discovered that academics are usually very productive before they are officially granted a tenure. Mostly, professors always have higher research productivity than associate professors and assistant professors do (Smeby & Try, 2005). Goodwin and Sauer (1995) indicated that the increase of research productivity occurs at the early stage of academics when they are still holding untenured positions. Diamond's (1986) life-cycle model of human capital investment states that when academics get older or have a tenured position, they might have other administrative duties that occupy their time. Such activities make them reduce their investment in, or commitment to, research activities. In contrast, participants who were professors demonstrated intrinsic motivation to do research in terms of reputation and peer recognition. These findings are similar to those of Goodwin and Sauer (1995) and Tien and Blackburn (1996) that found positive correlations between an increase in academic rank and research productivity, as well as different types of motivation (extrinsic vs intrinsic motivation) between the ranks (assistant professor and associate professor vs. professor). Hedjazi and Behravan (2011) found that the research productivity of academics sharply increases to a peak point in early career and then it declines gradually. To be recruited, some junior academics have to publish more than senior academics. Shin, Jung, and Kim (2014) note that many junior academics in Korea published more papers in international journals because they were under pressure to be productive for purposes of successful recruitment, while senior academics published in domestic journals. Tien and Blackburn (1996) also indicated that after obtaining tenure, academics, especially those of a high rank, such as professor, continued to be highly productive in research.

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Gender and family related factors

Sax et al. (2002) examined the relations of gender and family-related factors, such as marital status, number of children, and aging parents, to the research productivity of academics. The results indicated that gender does not cause any difference in research productivity, and family-related factors have little or even no effect on the research productivity of those academics. This is in opposition to findings from previous studies, such as those of Kaya and Weber (2003) and Zhang (2010), that demonstrated that female academics are often less productive than their male counterparts because women often have family responsibilities, such as looking after the housework and children.

Research interest and motivation

Research interest is expressed as a motivation to do research and is believed to enhance the research productivity of academics (Migosi et al., 2011; Bentley & Kyvik, 2012). Ramsden (1994) found that the research productivity of academics that have a research interest are three times higher than those whose interest is primarily in teaching. Similarly, academics who have high intrinsic motivation conducts better research, Ramsden (1994) emphasised that the research productivity of the most intrinsically motivated academics is often twice as high as that of the least intrinsically motivated academics in the same discipline and under the same working conditions.

Time allocation for research

Time allocated to research has a positive correlation with research productivity (Hu & Gill, 2000). Sadler (1999) emphasised that academics should spend regular time in research rooms, offices, laboratories, and, more importantly, that their activities should be directly linked to a particular research output, such as a manuscript for a journal paper or a book chapter. Kotrlik et al. (2002) found that work experience is a significant determinant of RP in terms of quantity and quality. Full professors were found to be more involved in networks known to promote publications and more likely to have research resources that facilitate publishing. Furthermore, they are more likely to be awarded external grants, which are regarded as one of the best predictors of productivity (Lee & Bozeman, 2005). Research found that if academics spend 50% of their academic time on research activities, their productivity is much higher than that of others who spend less than 50% of their academic time on research activities (Kaya & Weber, 2003).

Institutional Factors

The scientific literature on the determinants of a researcher's performance (Cole & Zuckerman, 1984; Harris & Kaine, 1994; Gonzalez-Brambila & Veloso, 2007; Costas et al., 2010) has shown how this depends on numerous personal and organizational variables. (Bland & Ruffin, 1992; Rix et al., 2004; MacGregor et al., 2006; Dhillon et al., 2015; Lamm, 2015; Gregory et al., 2016)

Teaching load

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Blackburn & Lawrence (1995) found that when academics' teaching loads increase, their research load and subsequent productivity will decrease. When class sizes continually increase but the numbers of permanent academics remained unchanged, universities in developed countries, such as Australia, are relying on a greater number of casual or sessional teaching staff (Klopper & Power, 2014). Quimbo and Sulabo (2014) conducted a study on the productivity of research staff in five state universities in Philippines. He found that educational attainment and teaching load significantly affect research self-efficacy which in turns affects their research productivity.

Departmental leaders and their leadership style

Bland and Ruffin (1992) stated that research knowledge of departmental leaders, their leadership style, and their professional expertise were found to significantly affect the research productivity of academics.

Salary increase and Promotion

Assistant professors were motivated to do research because of promotion and tenure, and associate professors preferred salary increase and promotion (Chen et al., 2006). Hamermesh and Pfann (2012) stated that academic staff salaries in universities have a strong effect on the quality and quantity of their research productivity. Relating salary to the number of publications can positively affect research performance of academic staff in universities.

The accessibility to research funds, and the research environment

Lertputtarak (2008) and Sulo et al. (2012) investigated factors that caused a low level of research productivity among academics .The analyses found that the accessibility to research funds and the research environment were positively correlated with research productivity. Quimbo and Sulabo (2014) also found that the accessibility to research funds is seen as important determinant of research performance especially when government resources are allocated to universities on the basis of research performance.

University curriculum

Kim et al. (2010) identified the weaknesses in the curriculum as a major institutional factor that can affect the research output. These weaknesses are due to lack of courses which focus on developing core research competencies, lack of intra- and external funding for dissertation research, and limited access to facilities.

Research Environment and Research Culture

Ab Aziz (2012) investigated research dynamics to enhance research productivity in Malaysian universities. He found that the university factors (environmental factors) influenced the research productivity. Quimbo and Sulabo (2014) investigated the impact of research policy, research funding, research benefits and incentives on research productivity and found that only research benefits and incentives load significantly on research productivity. Musiige and Maassen (2015) found that personal factors, behaviour factors and university factors are

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associated with the enhancement of academic staff in universities. Shahbazi-Moghadam et al. (2015) studied the factors that influence research productivity at Makerere University. He concluded that personal factors, behavioural factors and university factors are the most important factors to increasing university publication and citation rates. Sahoo et al. (2015) compared the research output of IIT and IIM in India and found that research productivity of faculty of IIT was more as compared to IIM due to institutional environment, research policy and leadership. Alrahlah (2016) identified the motivational factors affecting the research productivity of dental faculty members at Taibah University to publish in high-impact journals and confirmed that institutional factors play a major role to enhance faculty research production. According to Bengoa et al. (2017), it is very important to have research and development activities to enhance research productivity. Hanssen et al. (2018) revealed that the research environment is an important element to improve the quality of publications.

Measuring Research Productivity

"Research productivity" is the output of a research process. It can be measured in a variety of publishing outputs such as refereed journal articles, theses, books and chapters in books, and patents (Raston, 1998). It is also measured in terms of professional development opportunities such as conference presentations and research seminars; and the number of grant proposals submitted or the research grants received (Kaya & Weber, 2003). Among the types, it is recognised that publishing outputs (publication) are commonly used as measures to evaluate the research productivity of academics and researchers around the world. Publication is the key channel of intellectual products that disseminate new knowledge to the world, so it is very important. Creswell (1986) reviewed literature from the 1960s to the 1980s and found that the main indexes for measuring university professors' research performance include the number of research articles and number of citations of research articles. However, these indexes cannot represent the real quality of research articles and may cause problems in overemphasizing quantity versus quality; thus, some scholars thought peer ratings or peer reviews could be a better way to evaluate university professors' research performance (Cepero, 2007). Chen et al. (2006) divides university professors' research performance into several indexes: research project, journal article publication, book and book chapter publication, conference paper, patent acquired via research results, and academic award. Research productivity has been measured as the quantity and/or quality of the artifacts produced by faculty scholarship (Dundar & Lewis, 1998). Faculty work encompasses multiple interrelated activities of teaching, research, and service (Fairweather, 2002). Faculty development consists of program activities, practices, and strategies that aim both to maintain and to improve the professional competence of individual faculty .According to Alhaider (2015), research productivity is a primary indicator which is used to determine the performance of Saudi universities, and publications and citations are two critical indicators to evaluate research productivity.

Significance of Research Productivity

The matter of research productivity of academics has been a concern from as early as the 19th century, starting with the higher education system in Germany, and then moving later to the higher education institutions in the USA (Brodin 2002). The academic roles of higher education institutions comprise three major components: teaching, research, and service (Jauch & Glueck,

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1975; Edgar & Gear, 2013). Many studies indicate that a combination of teaching and research can enhance teaching quality because teaching quality is a desirable aim of all universities (Brew & Boud, 1995; Hattie & Marsh, 1996; Jenkins et al., 1998; Brew, 2003). Similarly, research enhances the knowledge and competence of academics, which, in turn, help them in supervising the research projects of students, especially postgraduate students (Lindsay et al., 2002).Lincoln (1998) and Lindsay et al. (2002)**,** agreed that undertaking research, advances the disciplinary knowledge of academics as well as increases their teaching quality. Research has been considered the most legitimate work of academics in research universities (Brew, 2003; Cummings, 2014) .At present, research productivity, in particular the publishing outputs, are considered the most important criteria in recruiting, offering tenure, getting promotion, and maintaining tenure at all research universities globally, which ensures that the newly recruited academics will become productive academic researchers in the future to serve the research goals of the universities (Perry et al., 2000; Cummings & Shin, 2014).

Research Gap

After the critical review it was found that there are adequate number of research being conducted on factors affecting research productivity in various countries but there is no specific research to explain the association of both individual factors and Institutional factors and faculty research productivity in KSA. The objective of this study was to examine the faculty research production during 2010-2020 and to investigate the individual and institutional factors affecting faculty research productivity at Princess Nourahbint Abdulrahman University, Riyadh.

MATERIAL AND METHODS

The population of study included the faculty of Princess Nourah Bint Abdulrahman University. The faculty research productivity of three ranks (full professor, associate professor and assistant professor) was measured. Secondary data was used to measure the research productivity of faculty in Princess Nourah Bint Abdulrahman University from 2010-2020. Secondary data provided by the Scientific Research Department were used for the Interpretation of results. The researcher verified the total number of publications during 2010-2020 by referring to the Scopus and web of science databases. The questionnaire has two phases of validation. The first phase is the face and content validity, whereby the questionnaire was sent to three subject experts in Saudi universities. Then, the authors analysed the results and prepared for the second phase of validation. The second phase of validation was a pilot study using T test to analyse the results. After that, this study used a Google form to send the questionnaire to the participants in the four different colleges of the university. To check the internal consistency Cronbach's Alpha, reliability test was conducted. The Cronbach's Alpha value should be more than 0.6, and Composite Reliability should be more than 0.7. The results for Cronbach's Alpha showed that Individual factors are at 0.855, Institutional factors are at 0.842. These results indicated that the internal consistency is valid for this study. Descriptive statistics i.e. frequencies, percentages, mean, standard deviation have been used to analyze the faculty demographics. Independent sample t-test was used to examine the impact of institutional and individual factors on the faculty research productivity at Princess Nourah Bint Abdulrahman University. Individual factors included the faculty academic rank, their area of specialization, administrative position, formal research training attended by the faculty. Institutional factors included the Institute research

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funding policy, Institute library resources, Institute research climate, Institute research infrastructure and facilities, Institute Reward policy, Institute research centre services.

HYPOTHESIS

H01: There is no significant association between Individual factors of faculty such as their academic rank, area of specialization, administrative position, formal research training attended and their research productivity.

H1: There is a significant association between Individual factors of faculty such as their academic rank, area of specialization, administrative position, formal research training attended and their research productivity.

H02: There is no significant association between Institutional factors of faculty such as Institute research funding, Institute library resources, Institute research climate, Institute research infrastructure and facilities, Institute Reward policy, Institute research centre services and faculty research productivity.

H2: There is a positive significant association between Institutional factors of faculty such as Institute research funding, Institute library resources, Institute research climate, Institute research infrastructure and facilities, Institute Reward policy, Institute research centre services and faculty research productivity.

RESULTS AND DISCUSSIONS

TABLE 1
RESEARCH PRODUCTION AT PNU FROM 2015-2020:INDICATORS OF SCIENTIFIC RESEARCH AT PRINCESS NOURAH BINT ABDULRAHMAN UNIVERSITY FROM 2015-2020

S. No	Details	Overall Research Performance in Numbers	Percentage
1	Scholarly Output	2530	48.6%
2	Citation Count	9851	
3	Authors	1360	
4	Average Field Weighted Citation Impact of PNU	1.05	
5	Citations per Publication	3.9	
6	H-5 Index	20	
7	Number of publications in the top 10% most cited publications	297	11.7%
8	Number of publications in the top 10%journals by cite score	322	13.7%
9	The number of citations for PNU university research	9851	
10	View Count by University Research by Scopus (University Research Reputation)	50,431	
11	Most viewed publication Worldwide	414	16.4%
12	Average Number of Scopus Views per publication at PNU	19.9	
13.	Average Field Weighted Views Impact of PNU	1.25	
14	Count of Patents citing the Scholarly output Published at PNU	10	

Initialy, Princess Nourah Bint Abdulrahman University ranking was the sixteenth between The Kingdom's universities in terms of the number of research published in the classified database WOS with 352 research papers. In the year 2020 AD, the university ranked twelfth, jumping four ranks. The number of classified scientific publications reached 2530, an

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increase in the number of female researchers to 1360. The average Field - Weighted Citation reached 1.05.Total citations reached 9,851. Average citation per search was 3.9. Total citations reached 9851. Total no of journals indexed in h5-index reached 20 (Table 1).

TABLE 2
DISTRIBUTION OF THE UNIVERSITY'S RESEARCH OUTPUT ACCORDING TO MAJORS

S. No	Publications by Subject Area	Percentage
1	Computer Science	**10%**
2	Mathematics	5%
3	Physics and Astronomy	5.7%
4	Chemistry	8.9%
5	Chemical Engineering	3.2%
6	Materials Science	5.1%
7	Engineering	7.7%
8	Environmental Science	3.4%
9	Agriculture and Biological Science	5.2%
10	Biochemistry Genetics and Molecular Biology	8%
11	Medicine	**11.6%**
12	Pharmacology Taxicology and Pharmacitics	6%
13	Dentistry	2.2%
14	Social Sciences	4.2%
15	Business,Management and Accounting	4.8%
16	Immunology,Microbiology and Energy	9%
17	Nursing	4%
18	Arts and Humanities	5%
19	Decision Sciences	5%
20	Multidisciplinary	5%
21	Health Profession	4%
22	Economics.Econometrics and Finance	4%
23	Neuro Science	3%
24	Psychology	3%
25	Earth and Planetary Sciences	2%
26	**Veterinary**	**1%**

It was found that the college of health sciences had the highest faculty research publications based on the total number of publications in classified journals (11.6%) followed by college of computer science with (10%). Faculty Publication of college of veterinary sciences was found lowest (1%) (Table 2).

TABLE 3
FACULTY PUBLICATIONS BY JOURNAL QUARTILE

S.no	Quartile	Number of Publications	Publications in Percentage
1	Q1	812	34.6 %
2	Q2	728	31.0%
3	Q3	528	22.5%
4	Q4	282	12.0%
	Total	2350	100

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The quality of research production can be measured by counting the total faculty publications in the best journals rated as Q1 or Q2 in the field of specialization. From the above data it can be revealed that the total number of faculty publication in Q1 magazine is highest with 34%, followed by Q2 magazine which is 31%, followed by Q3 journals with 22.5% and in Q4 being the lowest which is 12%. From the above data it is clear that the total number of research published of PNU faculty in classified journals Q1 and Q2 journals is more as compared to the Q3 and Q4 journals (Table 3).

TABLE 4
SCHOLARLY OUTPUT AT PNU, BY AMOUNT OF INTERNATIONAL,NATIONAL AND INSTITUTIONAL COLLABORATION. PERCENTAGE OF RESEARCH PARTNERSHIPS WITH THE UNIVERSITY (INTERNATIONAL AND LOCAL) AND OTHER INSTITUTIONS

S. No	Collaboration	Scholarly output	Publication Output in %	Citations
1	International Collaboration	1772	70.0%	7,612
2	National Collaboration	335	13.2%	1,266
3	Institutional Collaboration	123	4.9%	297
4	Single Authorship/No Collaboration	300	11.9%	676

Scholarly Output at PNU, by amount of International, National and Institutional Collaboration. The number of citations for scientific publications ranked in the top 10% of scientific journals. It was found that faculty publications were highest with international collaboration, followed by national collaboration, followed by Single Authorship. It was revealed that scholarly output was least with Institutional collaboration. It was found that The Citations with International collaboration is highest, followed by citations in National Collaboration, followed by single authorship. The citations with institutional collaboration were least (Table 4).

TABLE 5
PATENTS AND INDUSTRIAL DESIGNS DURING THE YEAR 2020

S. No	Type	College	Number of Patents and industrial designs
1	Industrial Model	College of Art and Design	2
2	Patented	College of Computer and Information Sciences	2
3	Patented	King Abdullah University Hospital	1
4	Industrial model	College of Health and Rehabilitation Sciences	1

It was found that there were two patents and industrial design got registered by college of art and design, Two got registered by college of computer and Information sciences, one patent got registered by king Abdullah University hospital and one patent got registered by College of Health and Rehabilitation Sciences during the year 2020 (Table 5).

TABLE 6
NUMBER OF PAPERS PUBLISHED IN WOS & SCOPUS DURING JANUARY, FEBRUARY AND MARCH FROM THE YEAR IS 2021

S. No	Month	Total Publications
1	January	65
2	February	210
3	March	73

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It was found that in January 21, Total 65 research got published in classified journals. In February total 210 research papers got published in classified journals. In March total 73 papers got published in classified journals (Table 6).

TABLE 7
RESEARCH PUBLICATIONS OF PNU FACULTY FROM 2010 TO 2021 IN ISI WEB OF SCIENCE JOURNAL

S. No	Year	Total number of Publications in ISI Journals
1	2010	1
2	2012	2
3	2013	1
4	2014	9
5	2015	42
6	2016	50
7	2017	133
8	2018	271
9	2019	399
10	2020	851
11	2021	153

From the Published data provided by the Scientific Research Department of the University it was revealed that the faculty research publication In ISI indexed journals were lowest during 2010, 2013 and 2012 followed by 2014. However in the year 2015 and 2016 there was a drastic increase in the number of publications with 42 and 50 researches published respectively in ISI indexed journals. From the year 2017 to 2019 the research publications accelerated tremendously in number with total 133 publications followed by 271 publications followed by 399 publications. In the year 2020, the total publications increased to 851 in number. Currently in 2021, the total publications which have been published in web of science journals are 153 (Table 7).

TABLE 8
RESEARCH PUBLICATION OF PNU FACULTY FROM 2010-2021 IN SCOPUS INDEX JOURNAL

S. No	Year	Total number of Publications in Scopus Index Journals
1	2008	4
2	2009	9
3	2010	19
4	2011	33
5	2012	62
6	2013	44
7	2014	61
8	2015	103
9	2016	132
10	2017	225
11	2018	374
12	2019	543
13	2020	1148
14	2021	348

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From the Published data provided by the Scientific Research Department of the University it was revealed that the faculty research publication In Scopus indexed journals were lowest during 2008-2010, However during the year 2011-2014 there was an increase in number of publication. From the year 2015-2019 the research publications accelerated tremendously in number with total 103, 132, 225, 374, 543 researches published respectively in Scopus indexed journals. In the year 2020, the total publications increased to 1148 in number. Currently in 2021, the total publications which have been published in Scopus journals are 348 (Table 8).

TABLE 9
DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS(N=136)

S. No	Demographic Variable	Scale	Frequency	Percentage
1	Age	25-35	41	30
		36-45	68	50
		46-55	27	20
		Above 55		
2	Academic rank	Assistant Professor	82	60%
		Associate Professor	41	30%
		Professor	13	10%
3	Department/College	College of Humanities	20	15%
		College of Sciences	49	35%
		College of Health Sciences	54	40%
		College of Community	13	10%
4	Highest level of teaching	Vocational college students	13	10%
		Undergraduate students	95	70%
		Master's students	20	15%
		Doctoral students	7	5%
5	Publications as a First Author	Yes	102	75%
		No	34	25%
6	Formal Research Training	No	36	26%
		Yes	100	74%
7	Administrative Position	Yes	41	30%
		No	95	70%

Descriptive statistics i.e. frequencies and percentages havebeen used to analyze the faculty demographics. It was found that the faculty who published in classified journals in PNU majority (50%) were in age group of 36-45 years, majority of authors (60%) were at assistant professor scale. The maximum publication were contributed by college of Health Sciences, Maximum faculty (70%) had the teaching experience at undergraduate level. Maximum faculties (75%) were able to publish as first author. Maximum faculty (74%) participated in a formal research training programme. Maximum faculty (70%) did not hold the administrative position (Table 9).

TABLE 10
CAUSES OF INCREASE IN RESEARCH PRODUCTIVITY

S. No	Factor	N	Mean	Std. Deviation
1	Institutional Research Funding Program	136	3.4932	0.98652
2	Institute Library Resources	136	3.3433	0.94183
3	Access to Online Databases	136	3.3100	0.97633

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4	Favourable research climate in your departments	136	3.1333	0.68108
5	Adequate Research equipment (laboratory)/ Office facilities for research (computers, printers)	136	3.1833	0.71381
6	Institute reward policy/Promotion/Appraisals for academics who have good research outputs?	136	2.9167	0.78412
7	Hours spend per week for research activity	136	2.8167	0.77312
8	Internet based technologies,social network websites for knowledge sharing.	136	2.82264	0.75321
9	University Support Services from research centre.	136	2.73263	0.74321
10	Opportunities to attend researchconferences and collaborate withinternational researchers	136	2.65432	0.73214
11	Opportunities for professional development And collaboration with other researchers.	136	2.54321	0.72134

From the mean scores it was found that the most significant factor influencing the faculty research productivity was the Institutional Research Funding Program, followed by the Institute Library and online databases. It was found that the university has favourable research climate in the departments with adequate research equipment, laboratory, and office facilities such as computers, and printers for research. Institute Performance Appraisals policy was also predicted as one of the prominent factor for encouraging faculty who have good research outputs. It was found that faculty spent moderate hours per week on their research activity. It was found that Internet based technologies; social network websites also played a significant role in the knowledge sharing process of faculty in order to increase the research output. University Support services from research centre were not found very useful for the faculties as most of the faculty in PNU university are not aware about the services provided by the research centre. Opportunities provided by the university to attend research conferences and collaborate with international researchers and Opportunities provided by the university for professional development and collaboration with other researchers were found as the least significant factor according to the mean scores affecting the Faculty Research Productivity at Princess Nourah Bint Abdulrahman University (Table 10).

TABLE 11
CHALLENGES FACED BY FACULTY IN GETTING PUBLISHED IN CLASSIFIED JOURNALS

S. No	Factor	N	Mean	Std. Deviation
1	Lacking opportunities to collaborate with international reseachers in order to improve research capability.	136	3.40	0.974
2	Having a low proficiency of a foreign language.	136	2.75	1.183
3	Having a low research capability	136	3.15	0.967
4	Barriers related to research infrastructure.	136	2.85	1.113
5	Barriers related to Funding of research.	136	2.20	0.738
6	Barriers related to library resources	136	2.35	1.157
7	Barriers related to technology.	136	3.25	0.998
8	Barriers related to Workload.	136	3.40	0.920
9	Barriers related to research policy.	136	2.25	1.066
10	Barriers related to knowledge about Statistical software	136	3.40	0.974

Based on the Mean scores it was found that the major challenge faced by faculty was to balance between teaching, research and administration so barrier related to workload was found

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as the major challenge faced by faculty to get published in classified indexed journals. Most of the faculties were satisfied with the Institute Research Funding policy so barriers related to funding was the least significant factor of faculty research productivity at PNU. Another Challenges faced by faculty in getting published in classified Journals was lack of opportunities to collaborate with international researchers in order to improve research capability. It was found that institutional factors were not the major challenges in Faculty research production at PNU but personal factors such as low research capability, lack of knowledge about statistical software and awareness about various technological tools that can enhance the faculty research production (Table 11).

TABLE 12
T-TEST OF INDIVIDUAL FACTORS AND FACULTY RESEARCH PRODUCTIVITY

S. No	Rank/Position	N	Mean	SD	t Value	P value	Percentage
1	Professor	13	3.6250	0.661177	3.114*	0.002	10%
	Associate Professor	41	3.1389	1.04776			30%
	Assistant Professor	82	3.12127	0.78802			60%
2	**Area of Specialization**	N			3.287**	0.001	
	College of health Sciences	54	3.5185	.57432			40%
	College of Arts and Humanities	20	3.2121	1.04536			15%
	College of Community	13	2.6667	0.70933			10%
	College of Sciences	49	3.4815	0.77883			35%
3	**Administrative position**	N			2.071**	0.019	
	Yes	95					70%
	No	41					30%
4	**Formal Research training attended**				1.697*	0.045	
	No	36	3.2000	0.65686			26%
	Yes	100	2.9333	0.72397			74%

*P<.05; **P<.01

Table 12 reports the t-test of individual factors of PNU faculty such as their academic rank, area of specialization, administrative positive and Formal training attended. A total of 136 faculty members participated in the study out of which 10% were professors, 30% were associate professors and 60% were assistant professors. Regarding the research output, 54% publications were from college of health sciences, 49% publications were from college of sciences, 20% publications were from college of arts and humanities and 13% publications were from college of community. 74% faculty had received formal teaching training and 26% participants did not receive any formal research training. It was found that professors and associate professors had more research output as compared to the assistant professor because of more number of hours available per week for research. Another factor was that associate professors and professors had more awareness about internet based technologies, social network websites for knowledge sharing. Another reason of associate professors and Professors to show better research productivity was as most of them were acting as the department head, so in order to influence the research productivity of their subordinates and other academician they needed to set example themselves of active research behaviours. Another reason of increased research productivity among professors and associate professors was supervising master's students and doctorate students to write thesis and dissertations. It was revealed that total faculty research productivity

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of faculty of health sciences and engineering was more as compared to the faculty of social sciences and humanities due to their awareness about statistical packages, information and communication technology, and more usage of digital library and online databases. From the above analysis it can be concluded that the research productivity of faculty was influenced by their academic rank, area of specialization, administrative position and formal research training attended.

TABLE 13
T-TEST :INSTITUTIONAL FACTORS AND FACULTY RESEARCH PRODUCTIVITY

S. No	Institutional Factors	t-value	p value	Significant level
1	Institute library resources	1.687	0.045	**
2	Institute Reward policy	6.536	0	***
3	Institute research climate	2.061	0.019	**
4	Institute research infrastructure and facilities	1.725	0.041	**
5	Institute research centre services	1.377	0.083	*
6	Institute research funding	2.656	0.004	***

*P<0.10:**P<0.05:***P<0.01

If the p value less than 0.01, it should take (***), which indicates a strong significance level.If it is less than 0.05, it should take (**), which is a medium significance level.If the p value is less than 0.10, it should take (*) as the significance level, meaning a low significance level. Moreover, if the T value is more than 1.28, its significance level is 10%. If T is more than 1.96, it is significant at 5%. If it is more than 2.33, it is significant at 1%.From the above table of Institutional factors; it is revealed that Institute research funding and Institute reward policy are strongly associated with the Faculty research productivity. It was found that Institute library resources, Institute research climate and Institute research infrastructure and facilities are moderately associated with the Faculty research productivity. However Institute research centre services exhibited a low association with the Faculty research productivity (Table 13).

CONCLUSION

Princess Nourah Bint Abdulrahman University, represented by the Deanship of Scientific Research, sought to raise the indicators of scientific publication registered in the name of Princess Nourah Bint Abdulrahman University by encouraging female researchers to engage in scientific research and distinguish them at the local and international levels, since the establishment of the Deanship of Research. Princess Noura University was the first to launch the Fast Track Program for Research Funding in 2019 with procedural facilities and huge financial resources .It was found that due to Institutional Research Funding Program the publishing rate was highest during the year 2020. Further, many programs were launched aimed at encouraging researchers and supporting them to engage in distinct research fields. The introduction and development of financing programs in the second half of 2019 and reached their climax in 2020, when the total number of financing programs reached nine financing programs. Hence it can be concluded that the research productivity got accelerated in 2019 due to launching of Fast track and other nine research funding programs. Also, during the year 2020, the university's research identity aligned with it was launched Vision 2030, and during this year there was an academic alliance between Princess Nourah Bint Abdulrahman University and the Saudi Authority for

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Intellectual Property, This led to awareness and activity in the field of intellectual property and the rights of researchers, which resulted in the registration of many patents and industrial models.

RECOMMENDATIONS

However, the Deanship of Scientific Research faces a fear of a decline in the indicators of classified publication for several reasons: 1) Determine the number of times female researchers can apply to the Fast Track Program. 2) Delay in approving the minutes of the Deanship's meeting during this year. 3) Delay in responding to the requests raised by the Deanship regarding the completion of its programs and about announcing them on all media platforms.

LIMITATIONS OF RESEARCH

1. Research analysis is limited to the time period from 2018-2020.
2. Only Published Papers were considered to determine research productivity: Research papers under study or accepted for publication were not included in calculating the total faculty research productivity.

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