Original article

Gender, age, research experience, leading role and academic productivity of Vietnamese researchers in the social sciences and humanities: exploring a 2008-2017 Scopus dataset

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Abstract
Background: Academic productivity has been studied by scholars all round the world for many years. However, in Vietnam, this topic has scarcely been addressed. This research therefore aims at better understanding the correlations between gender, age, research experience, the leading role of corresponding authors, and the total number of their publications in the specific realm of social sciences and humanities.

Methods: The study employed a Scopus dataset with publication profiles of 410 Vietnamese researchers between 2008 and 2017.

Results: Men did not differ from women in academic publications (P=0.827). The proficiency of corresponding authors positively correlated with the number of published papers (r_s=0.61, P<0.001). Lastly, the age of lead authors strongly correlated with scientific output (r_s=0.74, P<0.001 for authors between 40 and 50 years of age).

Conclusion: While scientific output correlated with the author ages and number of articles in which they led, it was not correlated with their gender in Vietnamese social science and humanities authors.

Keywords: career age, gender, productivity, publications, social science, Vietnam

Introduction

Research on factors affecting academic productivity has been going on for many years and continues to attract the community's attention. One of the most studied productivity factors is gender. Most studies so far indicate that male scientists have greater scientific production[1-11]. However, these findings vary by field[10]. For instance, in chemistry, Long[1] showed that men outperformed women during the first decade of the career, but the reverse was true in the later career.

Besides gender, two other factors that may affect academic productivity are age and research experience (sometimes called 'career age' in this study). Age seems to correlate with both the quality and quantity of scientific output[12-18]. Furthermore, age at first publication and the number of publications before doctoral degree also seem to affect academic productivity[3, 19-21].

Career age, defined as the number of years since their first publication, also seems to correlate highly with life-time academic productivity[22,23]. According to some reports, the number of publications peaks twice: first 5-10 years from the beginning of the career, and then when one is close to retirement[16, 24].

In contrast to natural sciences, however, productivity in the social sciences remains more or less level in all age groups[14]. This may be attributed to the fact that knowledge production in these fields is slower, allowing researchers to be productive throughout their careers[14]. However, Wagner-Döbler (1995) believed that if the number of scientists with different ages of career were standardised, it could be seen immediately that senior scientists contribute to the same extent as younger scientists, not only with regard to the frequency of publication but also with regard to especially influential ones[25]. He suggested that studies on scientific productivity should distinguish between a psychological or anthropological perspective and an account dealing with the structure and intensity of participation in a scientific discipline in the course of its development. The first aspect could be illustrated by measuring the speed of publication of scientists, the second by the structure of participation or output in a given period[24-25].

Regarding the scientific output in the world, North America, Oceania, and Western Europe produce the largest numbers of papers per citizen[25]. In Asia, research remains at a lower figure, 15%[26].

In Vietnam, the annual growth rate of scientific output between 2001 and 2015 was 17%, and international collaboration was about 77% of the total output, with Japan and America being the most significant collaborating countries[26, 27]. Three quarters of the growth was associated with international collaborations rather than purely domestic production, and internationally coauthored papers received twice the average citation of domestic papers[27]. Vietnam accounted for only 0.6% of the total Southeast Asian scientific production, though it ranked 4th[28]. In the group of six favored emerging markets countries (CIVETS), Vietnam also ranked 4th in total publications (after Turkey, South Africa, and Egypt) and 3rd in the number of citations per paper (after South Africa and Indonesia)[29]. While this is humble, these findings indicate that Vietnam is on the rise[27].

As the factors of age, gender, and career age seem to bear on scientific productivity, the aim of this study was to determine their impact in a sample of Vietnamese social scientists, specifically the relations between: age, career age, and gender of the leading (corresponding) author and the total number of publications.

Methods

The numbers of international journal articles published by Vietnamese social science scholars were collected from January to April 2017 from authors' personal homepages, institutional websites, journals in which Vietnamese authors have published, and the Google Scholar and Scopus databases.

Sample

The sample included authors of Vietnamese nationality with at least one publication explicitly related to Vietnamese issues or primarily concerning Vietnam for the research. We included authors indexed in Scopus, as its database[30] has more than 22,600 active titles — nearly twice as many as Web of Science[31]. Scopus has also been used for many influential international rankings such as QS[32] and Times Higher Education[33].

After gathering and cross-checking data to ensure reliability, we cleaned the dataset, eliminated incomplete profiles, and obtained a sample of 410 authors from social science and humanities, with the number of published articles indexed in Scopus from 2008 to April 2017.

Data collection

From the dataset we extracted information about the author's role using the following variables: "au.solo" for the number of articles in which the author was the sole author, "au.key" for the number of articles in which the author was the leading author, and "au.coll" for the number of articles in which the author was a co-author. In addition, we extracted information about the authors' age ("age_gr"), in four groups: under 30 years ("less30"), from 30 to under 40 ("b3040"), from 40 to under 50 ("b4050"), and 50 and older ("g50").

Other information extracted included gender ("sex"), career age (or number of years doing research, "restime"), location in Vietnam ("region"), and the total number of publications from 2008 to April 2017 ("ttlitems").

Statistical analysis

The raw data were entered in MS Excel, then processed and converted into the CSV format. The CSV file was then analysed with the statistical software R-3.3.1. Methods employed included Spearman's correlation test and the Mann-Whitney U test[34]. For categorical data analysis we used the models described by Vuong *et al*[35].

Results

The study sample is summarised in Table 1. Of the 410 authors in the dataset, 255 (62.2%) were men. The dominant age group was 35-45 years, accounting for 58% (236) of the sample. The average number of publications was 2 and the distribution is presented on Figure 1.

There was no difference in the numbers of publication between the genders [median (25-75th percentile) men 2(1-3) vs women 2(1-4), P=0.827](Figure 2).

Table 1: Descriptive statistics for key variables (N=410)

Variable	Min-Max	Median (25th-75th percentile)	Mean±SD
Age	19-72	40 (32.3-46.0)	43.10±9.15
Career age	2-64	15 (9.3-20.0)	15.05±8.76
Total number of publications	1-63	2 (1-4)	3.60±5.89
Number of papers as leading authors	0-60	1 (0.0-2.0)	1.77±4.24

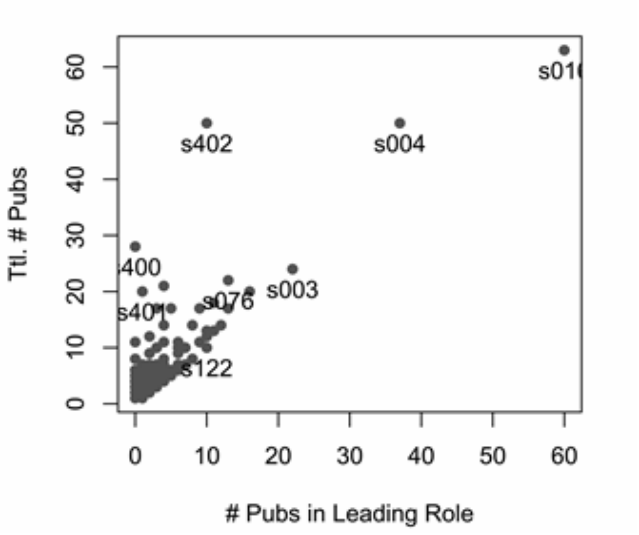

Figure 1. Distribution of number of publications

More than half the authors (58%, 238) were from the Northern provinces of Vietnam (Figure 3). Some overseas Vietnamese authors were also included (17%, 69), and the scientific output of this group displayed the strongest dispersion.

The shortest time in research was two years with one publication, and the longest was 64 years (much longer than the 15-year median); 339 (83%) out of 410 authors had 20 years of experience or less in their career. Almost all the leading authors held key positions in 10 papers or less; 2% (9) were leading authors in more than 10 publications.

Correlations between authors' leading role in publications, career age, and gender on numbers of publications are presented in Table 2.

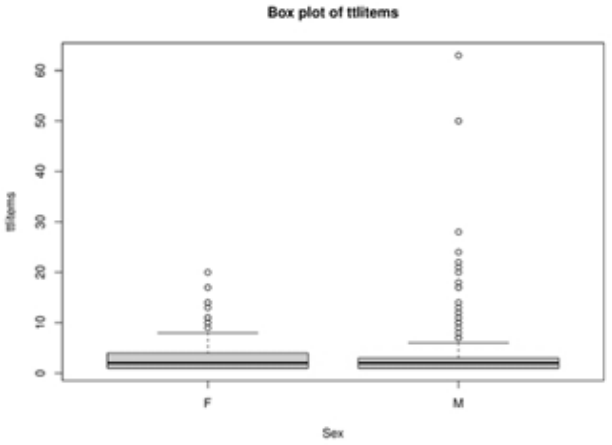

Figure 2. Number of publications by men and women

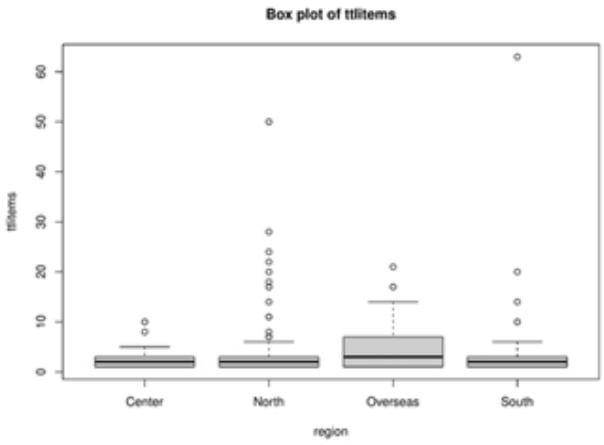

Figure 3. Number of publications by Vietnamese region

Table 2. Correlations between authors' leading role in publications and career age, sex and numbers of publications

	Number of publications	Number of papers in leading role	Author's age	Career age
Number of publications	-	r_s= 0.61 *P*<0.001	r_s= 0.14 *P*= 0.005	r_s= 0.12 *P*= 0.017
No of papers in leading role		-	r_s= 0.08 *P*= 0.095	r_s= 0.04 *P*= 0.452
Author's age			-	r_s= 0.89 *P*<0.001

The strong positive association between the number of publications by leading authors and the total number of publications (scientific output) (r_s=0.61, P<0.001) suggests that more publications in which the author holds the key position could result in a larger volume of lifetime publication.

The highest correlation was between the career age and author's age (r_s=0.89, P<0.001), while both elements show insignificant correlations with scientific output. This prompted us to further examine the correlations between age groups and the number of papers by leading author and productivity (Table 3). The coefficients increase from the ages of 30 to 50.

Table 3. Correlation coefficients between number of publications and leading author by age groups

	Age			
	<30 years	30-40 years	40-50 years	>50 years
Number of publications and number of papers in leading role	r_s=0.42 P=0.175	r_s=0.56 P<0.001	r_s=0.74 P<0.001	r_s=0.38 P<0.001

Discussion

Our preliminary findings about the productivity of social scientists in Vietnam reveal several things. First, the number of publications correlates with age and the number of papers in which they were the leading (corresponding) authors.

Second, men and women are equally productive. As early as 1978, Reskin[3] reported that even though men did tend to publish more chemistry papers than women, the difference was small. In a 2015 report about physics authors, however, Mairesse & Pezzoni[5] showed that women produced only one third of their male colleague's output. Several more recent studies suggest that while men had outperformed women in terms of publications and citations in earlier generations, this has changed with the younger generations. In fact, the scale now tips in favour of young female researchers, who seem to outperform young male colleagues, especially in developed societies[6-7].

As we expected, our findings confirm that older age is associated with more scientific output; scientists with 15 to 25 years of research experience have published the largest numbers of papers. However, there are a number of authors aged over 40 with fewer publications than younger researchers. The reason may be that the older generations of research scientists in Vietnam had less access to the global scientific community before the Internet and the socio-economic reforms in the 1980s. Another reason could be that they have reached the pinnacle of their career long ago and slowed down academic production.

The author's initiative and active attitude also contribute to the scientific output, which is supported by the strong correlation between the number of publications in which the researcher was the leading (corresponding) author and the total number of their publications. Corresponding authors are those who come up with the ideas, take control of a project, and take responsibility for the contents and quality of a paper. Therefore they not only require proficiency in their specific field but also a broad view of other social science issues and a certain degree of leadership. In addition, they have to meet today's strict ethical requirements, including those related to plagiarism[36]. As a result, they tend to produce more and better papers.

In contrast to the earlier findings of male scientific outperformance[1-9], our study indicates that in modern Vietnam these gender differences have disappeared, at least in social sciences. Essentially, marital and parental responsibilities of women and disadvantages in career and publishing opportunities seem no longer to hinder their scientific productivity. While this sounds encouraging, especially in the context of global efforts toward gender equality, the number of women scientists remains substantially smaller than that of men. Women, especially in a developing country such as Vietnam, often receive less support and encouragement in pursuing their academic careers than men. Higher productivity does not mean that women are now free to devote themselves to science; it only means that women who have remained in the field are as active and productive as men.

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Conflict of interest

None declared.

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