



RESEARCH ARTICLE

How scientific research changes the Vietnamese higher education landscape: Evidence from social sciences and humanities between 2008 and 2019 [version 1; peer review: awaiting peer review]

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Abstract

Background: In the context of globalization, Vietnamese universities, whose primary function is teaching, there is a need to improve research performance.

Methods: Based on SSHPA data, an exclusive database of Vietnamese social sciences and humanities researchers' productivity, between 2008 and 2019 period, this study analyzes the research output of Vietnamese universities in the field of social sciences and humanities.

Results: Vietnamese universities have been steadily producing a high volume of publications in the 2008-2019 period, with a peak of 598 articles in 2019. Moreover, many private universities and institutions are also joining the publication race, pushing competitiveness in the country.

Conclusions: Solutions to improve both quantity and quality of Vietnamese universities' research practice in the context of the industrial revolution 4.0 could be applying international criteria in Vietnamese higher education, developing scientific and critical thinking for general and STEM education, and promoting science communication.

Keywords

Social sciences research, research capacity, scientific publication, STEM, open science, industrial revolution 4.0

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Introduction

In order to provide high-quality output, universities need to maintain their available inputs, including physical resources such as buildings, laboratories, and non-physical resources such as the research capacity of researchers. The performance of an organization can be assessed based on how it maintains and combines these resources (Wright & Snell, 1998). Although there have been many studies on research productivity at the national and institutional level, the question of individual faculty's research capacity internationally still needs to be investigated. In addition, the relationship between the research capacity of university lecturers and students' achievement has been questioned. Currently, the task of improving research capacity for lecturers is still not an attractive investment option for universities, especially in developing countries where universities often put more importance on the teaching function of faculty members (Pham & Hayden, 2019; Salmi & Pham, 2019; Tran & Nghia, 2020). Around the world, organizations, and scientific circles in Asia, Africa, and even Europe still face obstacles in their scientific publication process (Flowerdew, 1999). The difficulties for researchers in Asia and Africa could be boiled down to technical issues such as language barriers, budget, and access to scientific journals; but also a lack of research skills in certain cases (Pho & Tran, 2016), while researchers in Western countries face problems in the thorough understanding and preparation of scientific publishing, ineffective criticism and the need for additional scientific research (Lyytinen *et al.*, 2007). Lyytinen *et al.* (2007) have listed the most prominent barriers to research institutions in Europe as the following: language and writing skills; preparation of PhD-level human resources; organizational orientation on research; and financial resources. The competence of an organization depends largely on the sum of its individual members' capacity for research; therefore, even the most prestigious organizations must devote themselves to the development and maintenance of personal research productivity, or at least remove barriers for their researchers.

In STEM fields, most barriers concern deficiencies in the infrastructure, e.g., laboratories and facilities (Manjunath & Shashidhara, 2011; Peppas & Harland, 1989), while social science researchers are more concerned with access to data, and research materials (Alzahrani, 2011; Mdemu *et al.*, 2017). Considering the whole process of scientific research, university lecturers face many problems regardless of their disciplines. In particular, the lack of access to scientific resources is the most common obstacle (Canagarajah, 2002; Flowerdew, 1999), and has been described as the root of the difficulty of research problems (Duszak & Lewkowicz, 2008). During the research period, the most common difficulty is budget, language skills, and research skills (Brooks *et al.*, 2005). Language skills, especially English proficiency, can also be considered as one of the common challenges for non-English-speaking researchers (Flowerdew, 1999). However, this obstacle is not only in the implementation stage but also extends to the publishing stage, when the researcher must work with the editorial board and reviewers to defend their arguments. The issue of 'linguistic inequality' must be addressed due to the high rate of rejection

when submitting published articles and the dominance of English in science publishing (Clavero, 2010).

In Vietnam, there have been many programs to promote research and international publication in recent years, which are encouraged and supported at various levels, from nationwide government-initiated policies to directives within schools and institutes. Scientific publication count has become a significant criterion to assess the research capacity of university lecturers. However, most research is commonly conducted in separate specialized research institutes in Vietnam (Pham & Hayden, 2019). In Asia, according to the *QS Asia University Rankings 2019*, there are only two higher education institutions (in top 250): Vietnam National University in Hanoi (ranking, 124), and Vietnam National University in Ho Chi Minh City (ranking, 144). From rankings 250–500, there are five more universities: Hanoi University of Science and Technology (ranking, 261–270), Ton Duc Thang University (ranking, 291–300), Can Tho University (ranking, 351–400) and Hue University, University of Da Nang (ranking, 451–500). For research papers per faculty indicator, only Vietnam National University in Hanoi and Vietnam National University in Ho Chi Minh City are included in the ranking, respectively, 5.1 and 2.3 research papers per faculty.

Regarding the international research network indicator, excluding Hue University and the University of Da Nang, the remaining universities are ranked as follows: Vietnam National University in Hanoi (104), reaching 74.2, with the lowest being Can Tho University (270), which reached 34. In particular, Ton Duc Thang University is the only university in Vietnam rated by the 4-star/5-star QS Stars University Rating, demonstrating the high level of international appeal, the quality of teaching, the level of research, and the learning environment. According to *QS World University Rankings 2019*, Vietnamese universities were rather modest in terms of rankings: the two national universities in Ho Chi Minh City were in the 701-750 group, whereas those in Hanoi were in the 801-1000 group.

According to the *THE World University Rankings* in 2020, for the first time, Vietnam has three universities that made this prestigious world ranking, including Hanoi University of Science and Technology (801–1000), Vietnam National University in Hanoi (801–1000) and Vietnam National University in Ho Chi Minh City (1001+). Among these, it can be seen that the highest research rate (volume, income, and reputation) belongs to Vietnam National University in Hanoi (9.1), and the highest citations rate (research influence) belongs to Hanoi University of Science and Technology (42.3). These recent statistics suggest a great effort from Vietnamese universities to expand their influence internationally. The effectiveness of scientific investment is a central theme in the implementation of science-education projects for all policy, governance, and funding organizations (Vuong, 2018). However, in terms of research index, Vietnamese universities lagged behind other universities in the world, which is entirely not surprising as the criteria used in rankings – such as facilities, staff capacity, and research quality – remained

weaknesses in Vietnamese universities (Hayden & Thiep, 2010). While Vietnam's research output has grown by about 17–20% a year (Manh, 2015; Nguyen *et al.*, 2017) in recent years, the country is not yet on par with leading research countries in the ASEAN region, such as Singapore, Thailand or Malaysia (Tuan & Ly, 2011). Moreover, the above figures cover all scientific fields in Vietnam, which are dominated by the natural sciences, which has published internationally earlier than social sciences and humanities (SSH).

This study aims to take a look at the SSH in Vietnam, a young field of research in terms of international scientific publications. By analyzing the overall trend in scientific practice in Vietnamese universities, the study discusses solutions to improve the efficiency of publications in SSH of Vietnamese universities in the context of the industrial revolution 4.0.

Methods

Data source

The SSHPA (Social Sciences and Humanities Peer Award) database (<http://sshpa.com/>) was used to review the Vietnamese SSH research between 2008 and 2019. We chose 2008 because this was when the Vietnamese national funding agency National Foundation for Science and Technology Development (NAFOSTED) was established, equivalent to the United States' National Science Foundation. The SSHPA database records the number of international publications of Vietnamese SSH researchers to review their scientific productivity. Here, international publications are defined as those published in ISI/Scopus-indexed

journals, and journals that are recognized by the Vietnam national funding agency NAFOSTED (Decision no. 251/QĐ-HDQL-NAFOSTED).

Moreover, some of the descriptive analyses were also based on the 2018 Journal Impact Factor (JIF; Clarivate Analytics, *Journal Citation Reports*, 2019), such as publication output.

The structure and technical specifications of the SSHPA database are publicly available in Vuong *et al.* (2018a). Some of the main features are tracking of individual scientists' productivity, as well as their affiliations, and providing quick and descriptive statistics of total productivity.

Data analysis

A data analysis website (<http://sda.aisdl.com/>) was used to generate descriptive figures and tables directly from the database. This is a closed access website; however, readers can recreate the figures and tables using Microsoft Excel or R statistical software based on the data that are publicly available (see *Underlying data*).

Results

As of January 10, 2020, only 3138 scientific publications by 2002 Vietnamese authors were recorded in the SSHPA database. This means that the total scientific productivity of Vietnamese authors in SSH over the last 11 years is rather low compared to overall domestic research, which is around 26000 articles (Adams *et al.*, 2019).

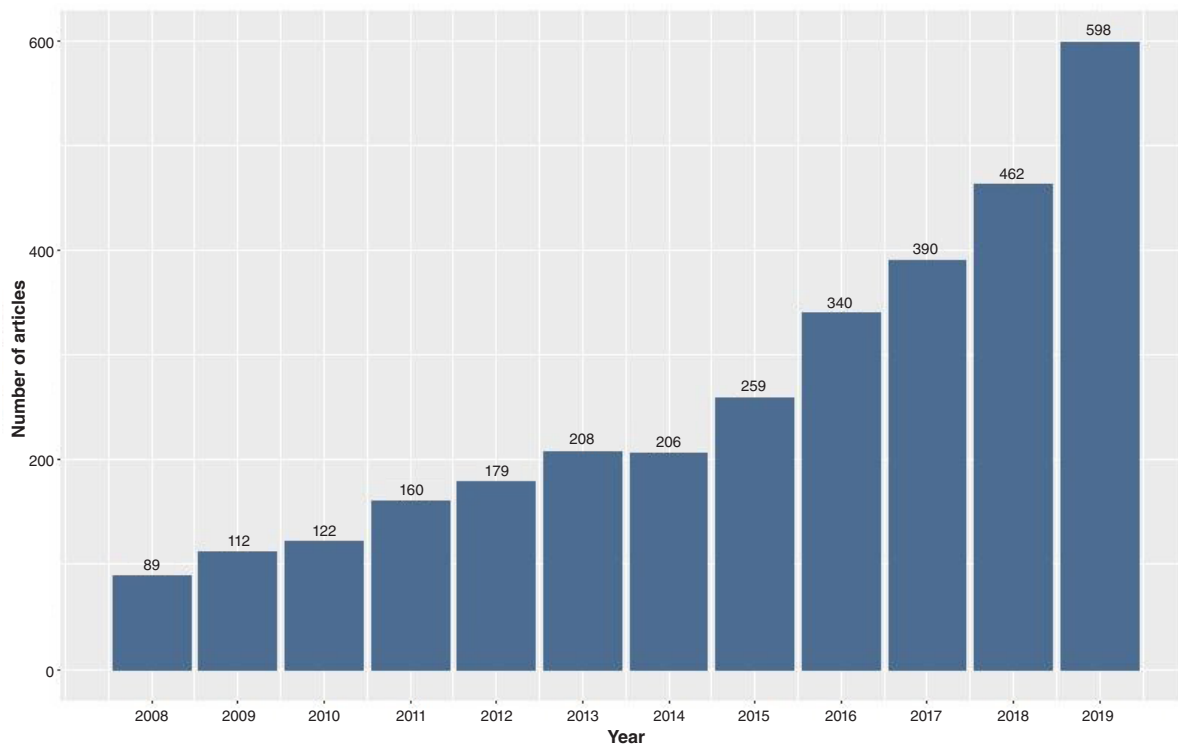


Figure 1. Total publication output of Vietnamese social sciences and humanities researchers between 2008 and 2019. Data as of January 10, 2020, according to sshpa.com.

The total annual output of SSH research by publications between 2008 and 2019 is shown in Figure 1. Initially, the growth rate is quite steady; then, from 2016, there is a marked boost in annual published output; from 2014 to 2018, the total output was nearly double compared to the previous six years. In 2019, the number jumped to 598, surpassing 2018 by 136 articles.

Based on the 2018 JIF, a large proportion of Vietnam’s international publications appear in journals with JIF < 2.5 (Figure 2). However, journals with JIF 3-5 also show a high number of publications from Vietnam. When the JIF is >5, the number of Vietnamese publications significantly decreases.

Table 1 below lists the institutions in Vietnam that have published in journals with JIF ≥5 in 2018. In general, most national universities and institutions with strong research capacity have been able to produce publications in high JIF journals. However, high JIF publications are rare in Vietnam, with only 13 out of the total 462 articles in 2018 that are in journals with a JIF of above 5. Notably, Vietnam National University Hanoi and Vietnam National University Ho Chi Minh, which are among the most prestigious universities in the country, have publications in high impact journals. Similarly, the Vietnam Academy of Social Sciences also has articles in high impact journals.

In this era of globalization, Vietnamese universities are at the forefront of educational reforms through their research and scientific contribution. Currently, several universities, such as Nguyen Tat Thanh University, Duy Tan University, Ton Duc Thang University, and Phenikaa University, have an accelerating research output (See Table 1; Lich, 2019).

Even though productivity is showing signs of progress in terms of publication count, the ratio of Vietnamese authors to published articles remains low (all under 1) (see Figure 3). The year 2019 is currently the highest, with almost 0.8 Vietnamese authors per article.

During the entire ten years, from 2008 to 2018, the number of female authors in total participating in research and publication in the field remains smaller than the number of male authors (Figure 4).

However, different developments could be observed when considering only *new* authors – defined as those who had their article published for the first time in the concerned year. In this case, the number of new female authors has increased steadily from 2008 to 2019, surpassing that of male authors from 2018 (Figure 5).

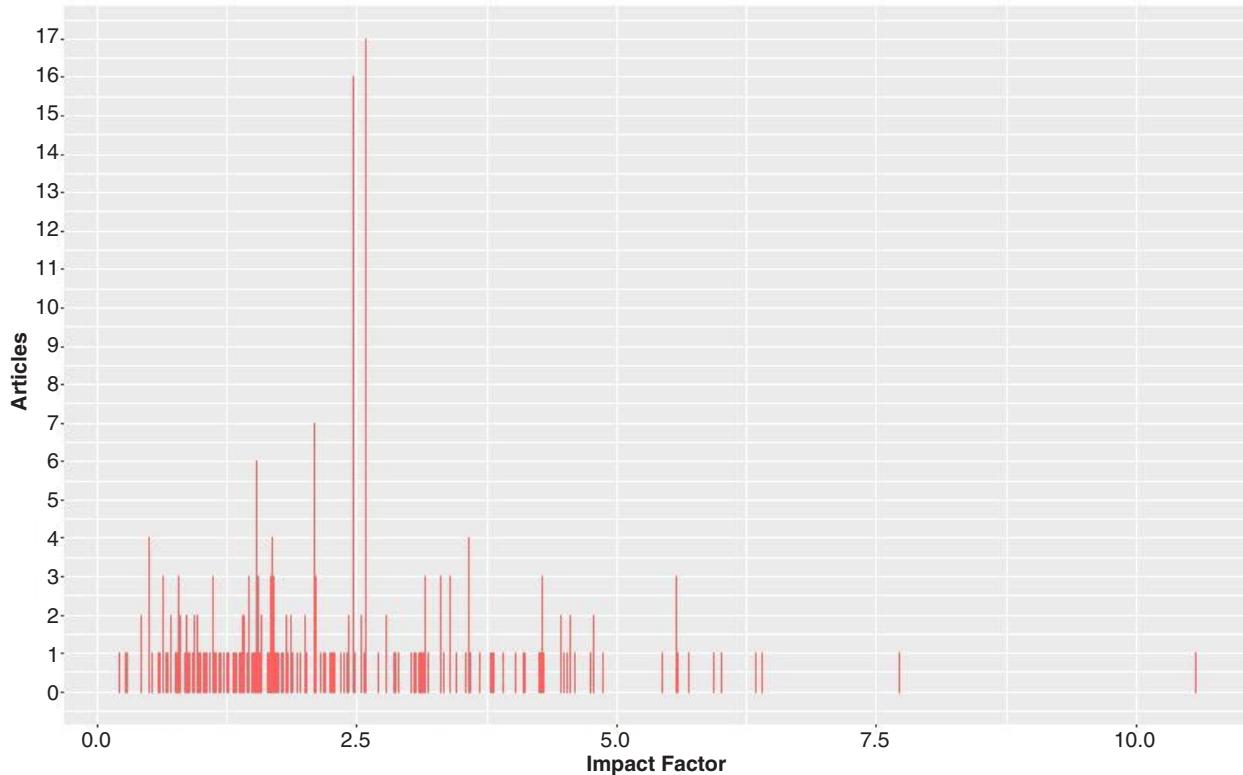


Figure 2. The overall distribution of Vietnam’s scientific publications in ISI journals with a journal impact factor in 2018. Data from Clarivate Analytics, Journal Citation Reports.

Table 1. Vietnamese universities and research institutes with social sciences and humanities research articles published in journals with journal impact factor (JIF) ≥ 5 in 2018.

| Units | JIF 2018 |
|--|----------|
| Centre for Interdisciplinary Social Research – Phenikaa University | 10.575 |
| Faculty of Banking and Finance – Foreign Trade University | 7.724 |
| Faculty of Economics – Tay Nguyen University | 6.395 |
| Centre for Interdisciplinary Social Research – Phenikaa University | 5.929 |
| Institute of Philosophy – Vietnam Academy of Social Sciences | 5.929 |
| Phu Xuan University | 5.929 |
| Vietnam Panorama Media Monitoring | 5.929 |
| Centre for Interdisciplinary Social Research - Phenikaa University | 5.688 |
| Institute for Social Development Studies | 5.688 |
| School of Law – Vietnam National University Hanoi | 5.688 |
| Ho Chi Minh City University of Agriculture and Forestry | 5.589 |
| Can Tho University | 5.572 |
| College of Environment and Natural Resources | 5.572 |
| Hanoi University of Science and Technology | 5.572 |
| Vietnam National University Ho Chi Minh City | 5.572 |
| RMIT University Vietnam | 5.439 |

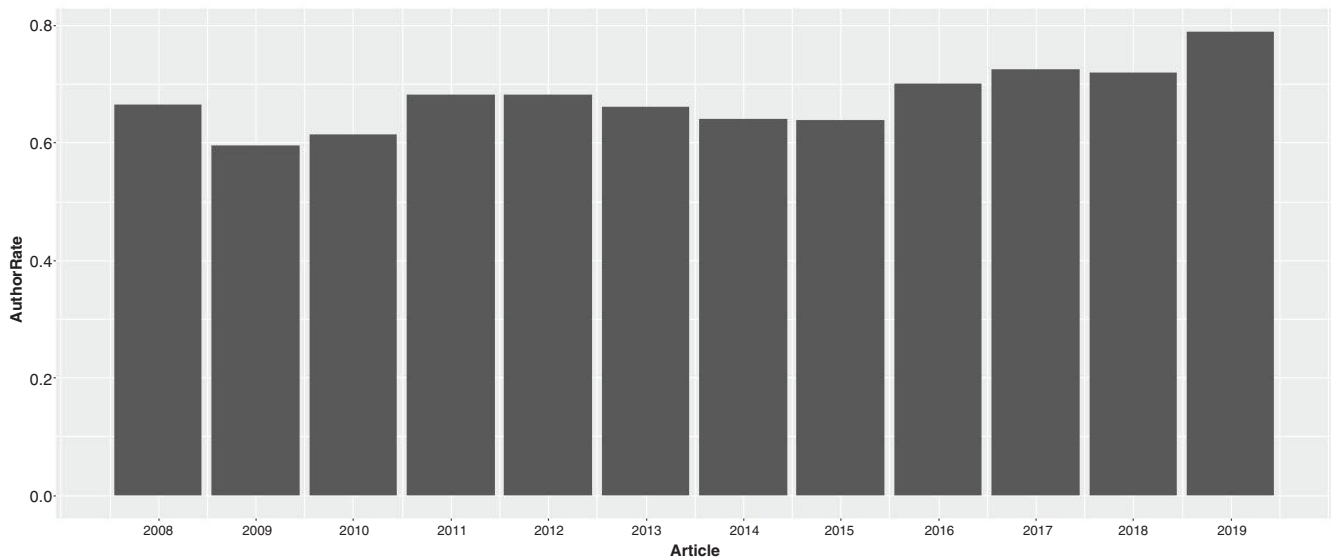


Figure 3. The ratio of a Vietnamese author in a social sciences and humanities research article from Vietnam from 2008 to 2018.

Discussion

The process of international cooperation in scientific research via co-authoring has seen a significant change over the last ten years (2008 to 2018) in Vietnam. In the context of integration and development, collaboration with fellow researchers abroad offers Vietnamese researchers an opportunity to experience international standards. Furthermore, given that universities and institutes in Vietnam are reorienting themselves towards research activities, it is inevitable that international publishing standards would soon take on an important role in evaluating academic results and scientific productivity. As such, international criteria for

granting tenure tracks or appointing individuals into managerial positions should be implemented in Vietnamese universities. National policies have started to consider international standards when outlining the recruitment and appointment of university positions. Recent regulations on standards of scientific publication for doctoral candidates, doctoral instructors and professorship candidates may be referenced. Using international publishing as a criterion and guideline for standards of quality, domestic universities should also not neglect to develop internal strength, to ensure and promote productivity and efficiency requirements of scientific investment (Vuong, 2018).

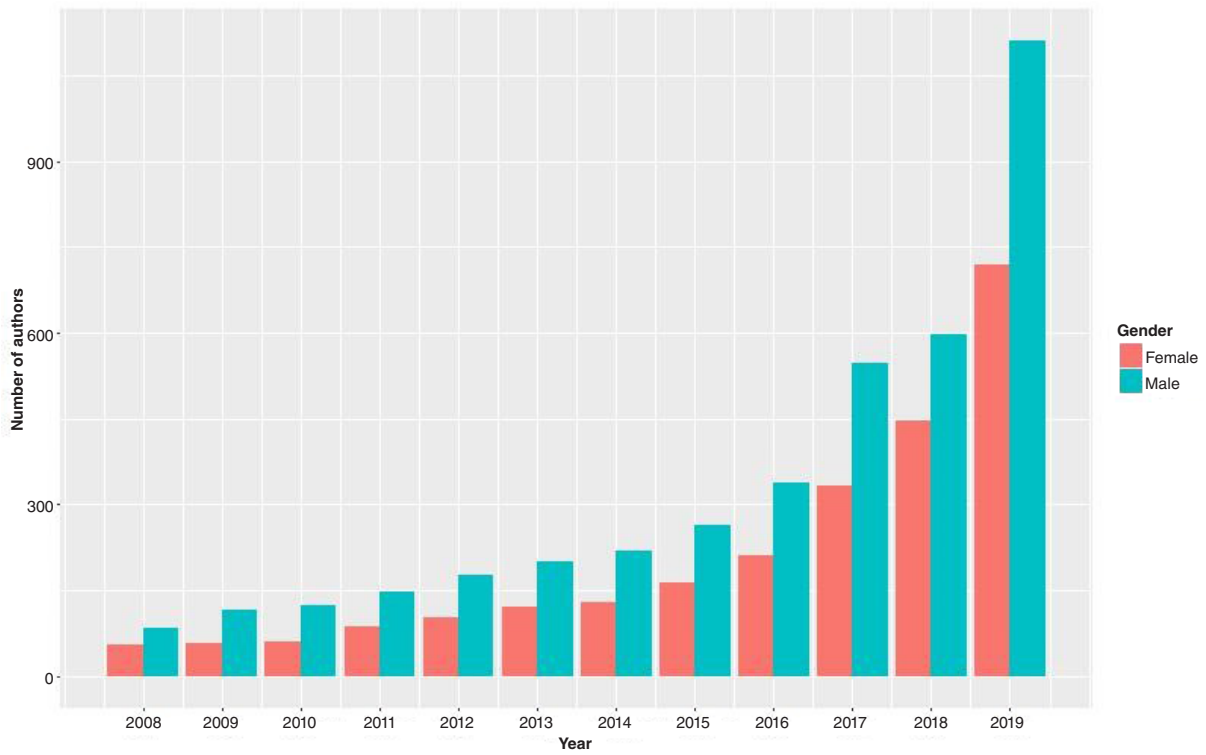


Figure 4. The total number of Vietnamese authors with international scientific publications stratified by gender for the period 2008–2019. Data as of December 14, 2019, according to sshpa.com.

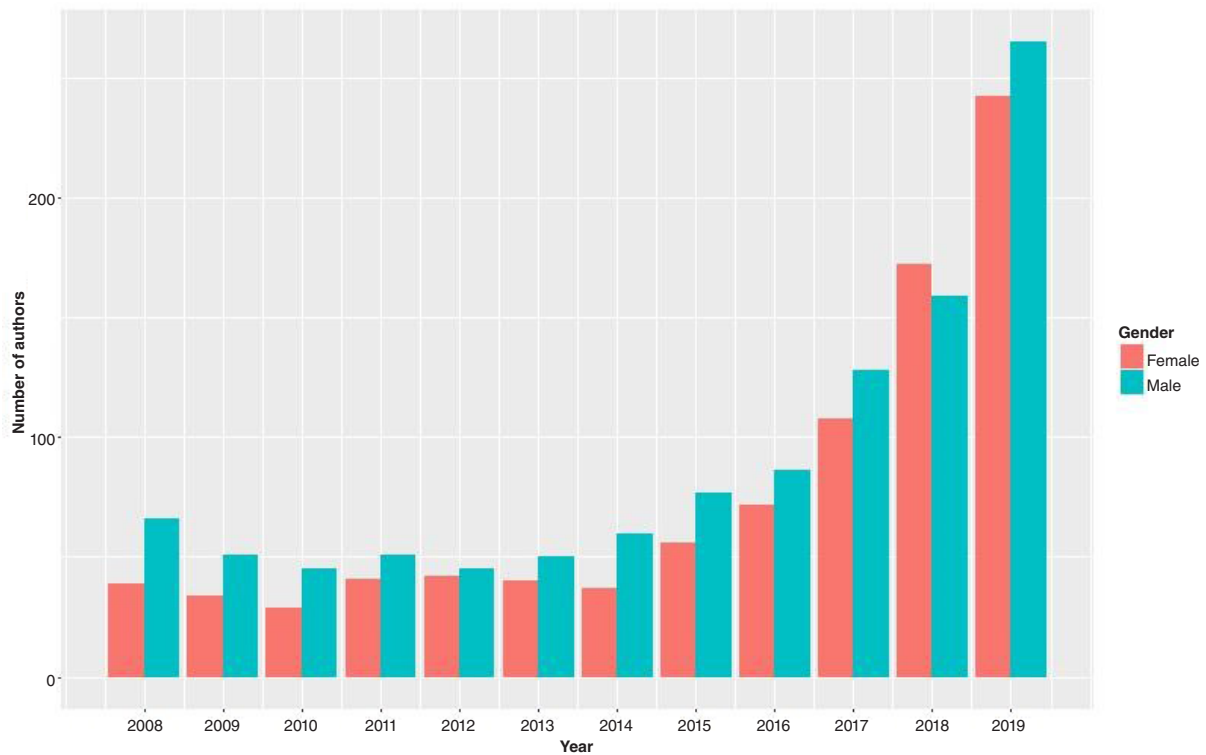


Figure 5. The number of new Vietnamese authors with international scientific publications stratified by gender for the period 2008–2019. Data as of December 14, 2019, according to sshpa.com.

Another change in the Vietnamese academic landscape, more specifically in the field of SSH, relates to gender equality. Recently, the subject of gender equality has gained much attention in Vietnam, especially as women continued to confirm their role in the workforce with the development of information and communication. Despite this, Vietnamese society still has certain conceptions about gender related to the division of labor, leading to career prejudices against women: namely, preventing women from entering jobs considered “strenuous,” and encouraging them to take up more people-centered jobs, such as those in healthcare or education (UNESCO & KWDI, 2013). Due to this stereotype and the crowd effect, young women often face more hesitation in choosing to follow the research path. The fact that men outweighed women in sheer accumulated numbers – in researchers as well as in publication point – is a manifestation of this phenomenon. A shortage of female scientists is a shortage of scientists in general; hence, creating a supportive environment to encourage women lecturers and scientists to have more opportunities in research would have the effect of improving the general scientific output in the country. As it has already been shown, the number of new female scientists had started to surpass that of new male scientists since 2018, suggesting Vietnamese women were ready to integrate into the academic environment and the publishing worlds. Overall, policies on wage transparency and on ensuring fairness in the voting and reviewing process for appointing titles and managerial roles will play an important role in achieving gender equality. It is also highly important to encourage female authors to participate in the editing process, comment on textbooks and curriculum, as well as raising teacher awareness about STEM and gender sensitization. The presentation of gender roles in the content of textbooks and learning materials must be done carefully, avoiding the over-focus on women’s preferences and perspectives as it will increase gender prejudice that already exists (Fousyia & Musthafa, 2016). At the same time, while showing off the image of female students studying at STEM majors is essential to inspire students, designing these contents should also be prudent to avoid impression confusing and overwhelming STEM subjects with students (Rosenzweig & Wigfield, 2016). The UNESCO report also points out the impact of testing on students’ STEM performance by gender. While boys are more likely to do well on standardized and multiple-choice tests (which may be due to a higher risk of inclusion), girls are more likely to favor essay and project writing because of language inclination and collaborative connectivity (Eurydice, 2010). In particular, the attitude of teachers might be gender-based and could affect female students, making the test results of this group lower while the male students hardly suffer the same effects (Beilock *et al.*, 2010).

Recommendations

The analysis of data on the academic community itself could be applied to improve the performance of scientific research and education in Vietnamese universities. Such analyses could consider taking advantage of Open Science trends and Open Data in particular. Open Science is viewed as one of the most critical trends in the current international academic scene, which creates profound effects on a global scale not only within academia but also socially and economically (Willinsky, 2005).

The movement strives towards taking down paywalls that lock out scientific knowledge and resources, including scientific publications, scientific data, and research tools, from public domains. It suggests a radical transformation of the current “closed” state of science, which had prevailed for decades, even centuries; only those who paid could access the aforementioned academic materials, which entailed the restriction of knowledge to a relatively privileged group of people. With openness in science, not only would doing science and disseminating knowledge become more egalitarian between both individuals and polities, but academia would also become more transparent: society at large – and not only bureaucrats – would be able to hold scholars accountable for their use of the state budget, or even to cooperate with scientists. Open Science should be seen as a new approach in carrying out, conducting, and managing research rather than just a program with a definite term. It is also an opportune approach in the context of the so-called Industry 4.0, when data and digitalized information are increasingly considered as the most important resource. Industry 4.0 has, in fact, taken place globally and applied to the field of educational science in Vietnam and has since contributed to the improvement of efficiency and effectiveness of research in this field. In a well-known study named by Chan *et al.* (2005), the authors point out six benefits of Open Science and Open Data, including (i) expanded access to international research results; (ii) expanded access to research done in developing countries; (iii) improvement to the research results of universities; (iv) improvement in citations and impacts; (v) expanded access to scientific data; (vi) supported peer review. The availability of Open Data also helps increase transparency in research by making all data public. It also helps to accumulate knowledge in the sense that fellow scientists could easily follow up on future research suggestions in existing studies by reusing data to develop new research (Pampel & Dallmeier-Tiessen, 2014).

Secondly, the academic community would benefit from rendering scientific research more accessible to mass audiences via science communication (SciComm). Efforts have been made to actively promote SciComm worldwide, attracting a large number of researchers or people who have gone through periods of professional or scientific research. It has, in fact, come increasingly close to becoming a professional job, which rapidly improved the quality of mass media dissemination of scientific knowledge. SciComm can also contribute to guiding the younger generation into a labor market more imbued by computer technology and data science than ever before.

In fact, letting students approach the scientific way of thinking and scientific methods from the high school level can create a premise to gradually improve the research capacity of the entire country. In recent years, STEM has emerged as an educational solution to the challenges of human resource quality in the 4.0 era, in which a large number of industries were replaced by automation. To improve STEM-related research and education capacity with interdisciplinary and cross-disciplinary integration, the general education program should consider focusing on nurturing systematic thinking, critical thinking, and creative skills.

Databases, analytical methods, and science communication have become essential factors that need to be implemented on many platforms. As the scope of what does constitute as data grows larger and data gathering methods become more and more efficient, data has become an important asset, both to private and national entities. Artificial intelligence, for example, is one creation that both stemmed from and benefitted from the enormous amount of data that had become storable and available. Databases, especially pertaining to science, health, and education could be considered precious resources at many levels and in various domains. Such data would give governments the necessary input to ensure efficient policy making and would allow researchers to further study social tendencies and issues. On a smaller scale, one such project of data gathering and storage was the Network of Vietnamese Scientists in Social Sciences and Humanities Project (<https://sshpa.com>). The result is rather significant: data extracted from this project had been utilized in seven publications (see [Ho et al., 2017a](#); [Ho et al., 2017b](#); [Ho et al., 2017c](#); [Vuong et al., 2017](#); [Vuong et al., 2018c](#); [Vuong et al., 2019c](#); [Vuong et al., 2018a](#)).

Finally, data storage is also an innovative and sustainable way to preserve cultural relics – such as ancient stories and old architecture – against the erosion of time. Modern approaches to statistical analysis such as the Bayesian method, can provide a stable fulcrum for scientists to harness and exploit such data ([La & Vuong, 2019](#)). In fact, a number of studies using Bayesian techniques have uncovered unique cultural phenomena based on folklores ([Vuong et al., 2018](#)) or old Hanoi houses ([Vuong et al., 2019](#)). Currently, as the frequentist approach to statistics is facing rigorous evaluation in the world, the use and mastery of Bayesian statistics would certainly be precious skills to gain for a nascent academic community such as that of Vietnamese SSH scholars.

Conclusion

Encouraging scientific research and improving productivity in terms of publication count, more specifically international publications, are urgent requirements to improve the performance of Vietnamese universities, especially in SSH. Additionally, promoting international integration through cross-border scientific collaboration could greatly improve the nation's technology, as well as fostering a solid foundation for the development of Vietnam's education system. In terms of economic development, while the facilities of Vietnamese universities have been improved in the past years, the quality of human resources and research capacity remained in the development stage. Overall, scientific investment in Vietnam is often seen as wasteful in the public eyes because there is a lack of quality control, and lengthy transition from theory to practical application. The situation of scientific publication in Vietnam is particularly modest when it comes to SSH: not only is the number of SSH faculties actively doing research still limited, contributions are also concentrated on a small number of researchers. In the context of globalization and development, enhancing international cooperation is a specific direction that Vietnamese researchers would greatly benefit from, in order to adapt to international standards. However, domestic universities should not neglect internal improvement to ensure and promote quality and efficiency ([Vuong, 2019b](#)). Likewise, improving the quality of not only research practice but also editing and

publishing is crucial to the development of Vietnamese science ([Vuong, 2019b](#)).

On the other hand, the issues of economic development, application of scientific findings, and improvement of life quality are still being questioned. Research in SSH are meant to first and foremost contribute to the fundamental understanding of one's society – in this case, the knowledge of Vietnamese individuals about Vietnam. The process of knowledge creation, of research, also improves the professional competence of each teacher, contributing to the sustainable development of future generations. Finally, scientific research contributes directly to fostering trust in academia as well as in the education system. Research activities thus create a reasonable ecosystem to support teaching, where teachers are regularly updated with new research results, and new methods that are produced daily. The new knowledge will help teachers tailor the curriculum so students have constant access to important sources of knowledge. Besides, postgraduate education, especially programs geared towards doctoral training, also requires a student to have an in-depth understanding of scientific activities, as well as also a willingness to work hard and to emerge, themselves, in the world of academics ([Vuong, 2019a](#)). Those requirements are substantiated by publications, which in turn play an important role in creating a reputation for a university, thereby attracting students and investment. For instance, if considered separately in the context of American universities, the top 115 universities have the highest research productivity ([Labaree, 2018](#)). The quality of research is a reliable factor with the strict standards of peer review, editorial and indexing of ISI Web of Science or Scopus journals. Hence, the reputation of science-based universities is a prerequisite for forming long-term relationships with scientific investment funds. To add to it, scientific publishing entails an arduous process, even after the manuscript has been drafted, as peer-reviewing, editing and printing could take up to a year – all of which required patience and perseverance. From a perhaps more philosophical perspective, academic productivity could be considered a measure of how researchers are pushing their limits as well as the boundary of knowledge of humanity.

Data availability

Underlying data

The source data used in this article can be accessed from <http://sshpa.com/>; <https://clarivate.com/webofsciencegroup/solutions/journal-citation-reports/>.

Open Science Framework: F1000Research Education 4.0, <https://doi.org/10.17605/OSF.IO/G6Y59> ([Ho, 2020](#)).

This project contains the following underlying data:

- Figure 1.csv: data presented in [Figure 1](#)
- Figure 2.xlsx: data presented in [Figure 2](#)
- Figure 3.csv: data presented in [Figure 3](#)
- Figure 4.csv: data presented in [Figure 4](#)
- Figure 5.csv: data presented in [Figure 5](#)

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