

Why are academics of science more productive than those of social science? Evidence from Indonesia

Science more
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than social
science

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Abstract

Purpose – This paper aims to examine factors influencing the productivity in research and publication between science and social science.

Design/methodology/approach – A qualitative approach with interviews for 40 academics in four public universities in Indonesia was applied to get an in-depth understanding of the issues.

Findings – The results of this study demonstrated that individual factors instead of institutional factors that contributed to the productivity of academics in science as compared to academics in social science.

Originality/value – Despite there were influential effects of institutions in which the socializing process of internalizing the values, norms and scientific roles under the auspice of qualified supervisors or advisors, there seemed to be an individual capacity that comes in between. The implications of this study are discussed in the article.

Keywords Research and publication, Productivity, Changing knowledge production, Stratification in science

Paper type Research paper

Introduction

As the practices and norms of neoliberal ideology have become the guiding principles in the management of higher education in Indonesia, research and international publication productivities have become the primary concerns of the government. To boost Indonesian academics' productivity in research and publication, particularly papers published in internationally reputable journals, the government, in 2017, released a new regulation obliging academics to undertake research and publish nationally and internationally. This regulation is said to have been effective in increasing the rates of research and publications of Indonesia from just only 8.350 in 2015 to 32.456 in 2018 (Scimago, 2018). However, the trend of the increase is not equally distributed among science and social science, where the former is producing more publications than the latter. This situation has concerned the Indonesian



government and called for an investigation on why such a trend occurs, and how to make social science academics more productive (The Ministry of Research and Technology of Indonesia, Kemenristek, 2018). This is because the performance of research and international publication are key indicators that may contribute to the status and performance of institutions both nationally and internationally.

International literature has identified such an issue as the problem of stratification in science. It has been argued that science is “highly stratified and elitist systems with skewed distributions of productivity and network” (Knorr, *et al.*, 1976, p. 2). In line with this issue, international literature has also been occupied with sociological and psychological theories that explain why this phenomenon occurred (Allison and Stewart, 1974; Merton, 1968). Among those theories are: sacred spark theory (Cole and Cole, 1973) and cumulative advantage theory of Merton (1968). According to the former, the productivity of scientists has closely associated with the “mental process” as it involves the psychological and cognitive structures with which scientists can undertake innovative and creative scientific research (Allison and Stewart, 1974; Fox, 1983; Cole and Cole, 1973). The latter recognizes the importance of early success supported by recognition and resource to continuously drive scientists to become productive. While there has been much research reported the combination of these two as factors to increase and differentiate research and publication productivity, it is argued that more individual factors than institutional factors that can explain pertinent to the skewed distribution of productivity between science and social science in particular (Kwiek, 2016).

However, a large body of literature investigating such an issue is dominated by quantitative research (Leišytė, 2016; Kyviak and Aksnes, 2015; Kwiek, 2016; Kotrlik *et al.*, 2002). The results of these studies showed a different result on whether institutional or individual factors are responsible for the lack of productivity among social scientists, hence need for a qualitative study. Also, these previous studies focused on developed economies and this paper might be providing fresh insights from an emerging economy perspective.

This paper aims to investigate why there are unequal distributions of productivity in research and publication of academics in science and academics in social science in four Indonesian public universities. Despite much research pertinent to this issue has been conducted, it is largely confined in the western or developed world (Teodorescu, 2000). Consequently, the cultural and contextual patterns of problems relating to this issue have been the domination of a well-developed research system, excluding those from developing countries in which an under-developed research system still exists. Therefore, indeed, the context of Indonesia where its neoliberal-driven research policy poses a new or current practice may add to new perspectives and patterns of the skewness in productivity of research and publication between academics in science and social science. Additionally, the nature of this study in the qualitative approach would expand the variety of approaches used to study this phenomenon.

Research regarding the skewed distribution of productivity in research and publication productivity among science and social science is important. This is because the result of this study may serve as early indicators for not only higher education management but is also institutional management in general, concerning the aspects that may be taken into account in recruiting qualified, skilled and capable new employees in their organizations. This is important to ensure their employees' future productivity to contribute to the success of organizations.

For policymakers in Indonesia and other contexts having similar conditions with Indonesia, the results of this study may also become indicators to take into account the aspects of disciplinary differences in the attempt to structure the mechanisms of academic performance assessment and evaluation. Therefore, to examine such an issue, this paper is structured in several sections. The first section is concerned with Indonesian higher

education with its new practice of knowledge production in research and publication. This is followed up by the description of the conceptual framework in conjunction with the review of relevant past literature. The next section is dealt with the methodology that reports the procedures and techniques in a qualitative approach to collect and analyze the data. The last two sections are concerned with the findings and discussions about the data yielded from Indonesian academics in four public universities across Indonesia.

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Indonesian higher education research and publication

The current culture of research and publication productivity of Indonesian higher education has been the product of a market and neoliberal-driven policy that aims to economically and politically boost the competitive edge of Indonesia internationally (Gaus, *et al.*, 2019). Following this, the penetration of some neoliberal and market principles has been pervasive with some consequences on the reorientation of the traditional basic assumptions of work, behavior, norms, values and identities of Indonesian academics. The repercussion of these changes is the utilization of corporate techniques and procedures that underscore the neoliberal dogmas, such as accountabilities, auditing, evaluation, surveillance and monitoring (Lorenz, 2012; Gaus, 2017) in the assessment and evaluation of work performance.

For the Indonesian government itself, the market and neoliberal-driven policy may mean that the economic and competitive edge of Indonesia can only be accomplished via research and innovation. This caveat has persistently been echoed by the government and it has pushed higher education to boost its productivity and innovation in research and international publication in peer-reviewed reputable international journals. The government's desire to make higher education as a sphere to produce research and innovation to gear up the economic competitiveness of Indonesia has been realized in the considerable increase of resource allocation. In 2016, the government via the Ministry of Research, Technology and Higher Education (Ristek Dikti) increased research funding to 100% from just Rp. 800 *bn* to Rp. 1.53 *tn* in 2018 (Ristek Dikti, 2018). As the paradigm on research has changed from "research as spending" to "research as an investment", the commitment of the government to raise research funding continues to corroborate. This is realized in the new formation or structure or mechanism of research funding agenda in 2019 which is managed under what is called "Research endowment fund".

That is not all, the increase of research funding is followed as well by the renewables and changes in the extant regulation of research and publication in higher education, to adapt to rapidly changing and challenging environments. The release of regulation no. 20, 2017 marks the new stride of the government's regulation. This regulation calls on academics, particularly those with professors, assistants and associate professors level to become productive in research and international publication. The sanction and reward mechanisms as brought in by NPM principles are applied.

Additionally, to assist academics to improve their skills, many workshops pertinent to how to write academically for international publication have been held. The funding allocated by the government in 2019 for these is Rp. 3.6 *bn*. This funding is aimed to reach the highest rate of international publication and become the first top among Southeast Asian countries. That is not all, academics who are only master's degree holders are encouraged to pursue doctorate studies both at domestic and at foreign universities. A large number of scholarships to assist and facilitate them is provided every year. This is meant to give opportunities for them to improve and hone their skills and capacities under the guidance of qualified and skillful supervisors at both domestic and foreign universities.

All of these efforts and sacrifices have been paid off with the considerably significant soar in the rate of international publication of Indonesian academics. The data obtained from the Scopus database in 2018 recorded Indonesian publication stood at 20.610. This rate has made Indonesian academics' publications in the second position among Southeast Asian

countries. This is expected to rise significantly in 2019 with the expectation to rank in the first position.

However, indeed, behind the success of the international publication leap, there is a skewed performance of publication between academics of science and social science, where the former produce more publications than do the latter. This is the issue raised in this study, exploring why science disciplines are more productive than social disciplines?

Conceptual framework

Research and publication are important variables nowadays both for the personal merits of academics and for the economic growth of nations. Due to their importance, much research has focused on the factors that may increase research and publication productivity based on productivity theories. Those theories are individual-level characteristics, environmental location, cumulative advantage and reinforcement theory (Fox, 1983).

Environmental location

This theory of productivity is attributed to the considerably important functions of environments or organizations in which socialization processes of developing skills, knowledge and competence take place. The extent to which this process of socialization to be effective is determined by several predictors, they are the caliber of graduate school training, the prestige of scientists' institutional affiliation and organizational freedom in the institutional location (Fox, 1983). In light of this, graduate school background poses as an important milieu in which protégés can pave and build their early productivity in research and publication via the guidance of mentors or supervisors to shape, forge and internalize the norms, values and standard of scientific roles. Much research has shown that predictors that make academics productive in research and publication in certain departments or institutions are the combined factors between previous doctoral scientific training and socialization. These are mediated by the roles played by the caliber mentors or supervisors and the prestige and ranking of institutions (top-ranked) (Williamson and Cable, 2003; Zuckerman, 1967; Kram, 1995; Paglis *et al.*, 2006). These constructs, the prestige of institutions and the caliber of supervisors are foundations to foster and forge early habit and practice of researching and publishing for PhDs or doctoral students. This early experience can pave the way to become successful and productive researchers in their future careers in given institutions (Williamson and Cable, 2003; Zuckerman, 1967; Kram, 1995; Paglis *et al.*, 2006).

However, the effect of the status and prestige of institutions is stronger in western countries than that of non-western countries (Bentley and Kyviak, 2013). Broadly speaking, there is a perception that prestige or top-ranking universities are frequently associated with western countries with developed research systems, while those with underdeveloped research systems are frequently portrayed as developing countries. The consequence of such a perception emerges out the supposition that doctoral students graduating from western universities are most likely to become productive in their future careers than those graduating from less-developed universities. Although much research has been undertaken to examine such an issue, the results are still inconsistent across the nations in general, and across disciplines (science and social science) in particular. Research conducted by Shin *et al.* (2014), conducted in three universities in Korea, Malaysia and Hong Kong tried to address this issue. Their data confirmed that foreign degree holders are not more productive than their colleagues with domestic degree holders. Foreign degree holders of doctoral soft science are much less productive in Korea, while in Malaysia they are much less productive in hard science. Conley and Onder (2014) with their findings yielded from the US universities also signaled that the status and prestige of institutions do not help, particularly PhDs economics to become productive economist researchers. Whereas Gu *et al.* (2011), Long *et al.* (1998) reported contradictory results.

In Indonesia, a good number of academics has been sent abroad to continue their doctoral program in high-ranked universities. However, few of them have had an opportunity to publish during their doctoral studies. Consequently, they may become less or even not productive at all when they returned to their home institutions. Therefore, indeed, by looking at this theory, we can examine why the puzzle of productivity occurred, particularly in Indonesian contexts. Thus, the data yielded from Indonesian universities, associated with less-developed research system, in this study, may add the nuance to such inconsistent conversation in literature. In line with this, it is argued that research and publication productivity related to the prestige of institutions (developed and less-developed countries), and the caliber of supervisors may correlate to research productivity for both science and social science if they are mediated by individual capacities of scientists.

Cumulative advantage and reinforcement theory

Structural approach or environmental location emphasizes the role of environments or organizations to develop productive researchers, mediated by graduate school training and the qualification of supervisors or advisors through the process of scientific roles, values, norms socialization. Cumulative advantage theory, on the other hand, combined with reinforcement theory, recognizes the role of early success or productivity as the reinforcement for the next or future achievement or productivity of researchers. In other words, early success in research and publication constitutes fundamental motivation or drive for researchers to conduct research and publish more (Fox, 1983; Kwiek, 2016).

One of the important predictors promoted by this approach is collaboration. Katz and Martin (1997, p. 7) defined collaboration as “the working together of researchers to achieve the common goal of producing a new scientific knowledge”. Subramanyam (1983), Katz and Martin (1997) elaborated on the types and different levels of collaborations: individuals, groups, sectors, departments, nations and institutions. In this globalized, neoliberal and rapidly changing environment, the trends and patterns of collaboration beyond the national boundaries of scientists have gained prominent ascendancy. This is due to, in part, the global complexity of problems and challenges encountered that needs a global share of knowledge and collaboration to face and resolve the problems. However, international collaboration among scientists is also used to predict academics’ or scientists’ research and publication productivity and research impacts (citation) (Jiang, *et al.*, 2018; Didegah and Thelwall, 2013). Kyvik and Teigen (1996), Ductor (2015) emphasized that academics who did not collaborate were less productive than those who collaborated, and researchers with wider foreign scientist networks tend to be more productive (Levitt and Thelwall, 2016; Kyvik and Teigen, 1996).

Although international collaboration has wider and stronger effects on research and publication productivity, its impacts varied across disciplines. A stronger effect was found in science (Abramo, *et al.*, 2009; Didegah and Thelwall, 2013). Science also has more intense international collaboration (Franceschet and Costantini, 2010), and gain high research impacts (Jiang *et al.*, 2018), compared to social science. However, Jung (2012) exhibited a different result where he found the effects of collaboration were stronger in social science than that of hard science.

However, the engagement of researchers in a wider network of international collaboration may only contribute to increasing the number of publications and research impacts for western scientists, but this may not be the case for less-developed country researchers (Jiang *et al.*, 2018; Gazni *et al.*, 2012). Gazni *et al.* (2012) confirmed that researchers or authors from developed countries (western countries) tended to intensively collaborate with and their articles have predominantly highlighted international scientific papers. For Indonesian academics, collaborations among foreign researchers have been in place, and they have been considered as one way that may help academics of universities increase research and

publication productivity. However, the evidence showed that academics of science collaborated more intensively with foreign collaborators than those of academics of social science. An interesting point appears from this that in such a collaboration, they tended to be positioned in the second-order authorship. This phenomenon is interesting to research. Therefore, research conducted in Indonesian contexts is once again expected to contribute to these differentiated phenomena.

Individual-level characteristics or sacred spark theory

This approach helps understand and explain why other researchers are more eminent than others. The indicators used are individual characteristics that consist of *inter alia* psychological traits, work habits and demographic characteristics (Fox, 1983; Kwiek, 2016; Allison and Stewart, 1974). Among these three constructs, psychological traits are the most frequently used in a wide range of studies to investigate scientists' research and publication productivities. These psychological traits comprise several components, such as ability and motivation, stamina or the capacity to work hard, cognitive, emotional and perceptual styles of productive scientists (Fox, 1983).

In light of the psychological perspective, much past research has been focused on different types of psychological perspectives, such as personality structure, the biographical background of scientists and the cognitive structure. The latter is closely related to the aspects of the style of thinking and perceiving. It is part of the ability of ones to play with ideas, concepts and theories (Fox, 1983) and how the ones integrate ideas, concepts and theories in their thinking style, perceiving, writing and analyzing data obtained from research. Researchers or scientists who are imbued by these features and can transfer these into their research may be called a creative personality'. This creative personality may become a determinant to understand why other scientists can undertake creative and scientific research and others cannot (Fox, 1983; Kwiek, 2016; Allison and Stewart, 1974; Haller and Courvoisier, 2010; Kuncel *et al.*, 2004; Rushton *et al.*, 1983). It is accordingly, it can be argued that creative researchers or scientists are the product of a creative personality.

Creative researchers or scientists may become predictors to research and publication productivities. A similar result was exhibited by Kwiek (2016). Although his study was not particularly focused on the creative personality of psychological traits, his undertaken across the European research elite in 11 countries concluded that individual factors rather than institutional factors that contributed to the high level of productivity among these European research elite. Research conducted by Levin and Stephan (1991) also found that there were productive scientists due to their possession of talent and motivation. While, Bland *et al.* (2005) found that the individual factors supported by institutional factors increase research and publication productivity.

We believe that creativity and personal characteristics that differentiate productive and less productive academics among Indonesian academics in this study. This theory, then, may help us to examine whether productive academics from science are creative researchers compared to their counterparts of social sciences.

Methodology

This study was part of the large research project funded by the Indonesian Endowment Fund for Education (LPDP). We used a qualitative approach as we aimed to gain rich and deep data from respondents to explore the puzzle of productivity of Indonesian academics' research and publication. The data collection was undertaken from February to September 2018, in four public universities in Indonesia. These universities were located in the western and eastern parts of Indonesia. The sampling procedures were informed by the ideas of homogeneity and

heterogeneity (Bryman, 2012). We performed two types of samplings in this research, they are the sampling of context and the sampling of participants (Bryman, 2012; Creswell, 2008). Following these, we included universities that are fully funded by the government (public universities) to assume homogeneity of the contexts and exemplify the whole contexts of Indonesian higher education. Besides, as our research aim is to examine factors influencing the productivity of academics in research and the international publication, we assumed that the sources of data are available in these settings. These contexts were sampled based on the “cluster of research and publication performance”. In Indonesia, the performance of research and publication of each university is subsumed under (1) Autonomous cluster, (2) Prime Cluster, (3) Semi-autonomous cluster, (4) Nurtured cluster. Of these four only those in cluster 1–2 were included in this research. Based on the Indonesian Science and Technology Index (SINTA, 2019) we chose or sampled two universities from the autonomous cluster and two from the prime cluster. To represent the geographical location, we selected each one university in each cluster in the western and eastern regions of Indonesia. The sampling of participants was informed by the stratified sampling procedures, where we sampled participants in two broad fields: science and social science. Participants in both fields were selected based on some criteria (1) males and females, (2) graduated from both domestic and foreign universities, (3) hold master and doctoral degrees. To obtain such participants we approached four selected universities for the data, particularly the administrative staff. Because we wanted to gain rich and deep data from respondents, we purposively selected academic respondents whom we believed knowledgeable academics regarding the issue raised in our research question. From this process of samplings, the data were yielded from 40 academics both male and female in the disciplines of science and social science. In this research, science disciplines were classified in the disciplinary areas of life science, mathematics, veterinary, physics, computer and information technology. Social science disciplines were grouped in the disciplines of politics and government, social development and welfare, political science, educational science and the English language. To protect anonymity, we used pseudonyms to refer to participants in this study. As there are no standards of the maximum and the minimum number of respondents in qualitative research (Bryman, 2012; Cohen *et al.*, 2007), we recruited participants based on the *saturated condition* of the data yielded. So, 40 academics are considered enough, due to the saturation point was reached within this number.

To strengthen the trustworthiness of the chosen methodology and method, an *audit trail* pertinent to the transparency and credibility of the research process (Tracy, 2010) is elaborated in this study. This audit cuts across the process of participants’ selection and recruitment and the analysis of data. In parallel with this, before recruiting academic respondents, permissions were sought to the rectors and deans of each university and faculty. Once permissions were obtained, the process of identification of potential respondents was conducted with the auspice of administrators in each faculty. From them, information about academic respondents was gained along with their contact phone numbers. Upon receiving these, these potential respondents were purposively selected and they were contacted to participate in this research. In the process of the invitation, the respondents were kept aware of the purpose of this research, the rights and the nature of respondents’ participation. These processes were reiterated in the interviews.

Forty academics of both males and females participated in this research and the schedules of face-to-face interviews were arranged based on the approval and the discretion of respondents. Of 40 participating academics, 15 of whom are males and the other 25 academics are females. These participating academics varied in their age, length of employment and educational background. Of 40 academics, five are aged above 60 years with more than 33 years of working experience, 10 are between 50 years and above with 30 years of working experience and 25 are between 35–50 years with more than 20 years of experience. About the

educational background, 26 academics are foreign doctoral degree holders, while another ten are domestic doctoral degree holders, and the other four are academics holding overseas master's degrees.

Semi-structured interviews were used to interview academics and they were conducted in the office of each respondent during February–September 2018. Such interviews with prepared open-ended questions were applied to allow flexibility in reordering and expansion of the contents, and further probing to respondents (Cohen *et al.*, 2007). The questions in these semi-structured interviews were grouped into demographic questions; past educational background and experience during doctoral and master studies; current conditions in each of the respondents' institutions and challenges they face. Some examples of questions asked to each respondent were: could you please describe your efforts in conducting research; could you please describe your efforts in publishing your articles in international journals?

The interviews were recorded using a recording device with the approval of the participants, which lasted between 45 min to one hour for each respondent. Forty participants are considered sufficient to obtain deep, strong and rich data because they were drawn from heterogeneous backgrounds or characteristics. As Patton (1990) argued that "any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences and central, shared aspects or impacts of a program" (p. 172, as cited in Gaus, 2017). The participants were females and males holding different backgrounds.

The data were analyzed using a systematic qualitative data analysis proposed by Miles and Huberman (1994). The interviews were analyzed through coding processes to generate categories and themes. The research questions were used as a guide for producing codes. The coding process was conducted by the three researchers involved in this research. The results of this coding were compared to generate categories and themes. The original interview transcripts (in the Indonesian language) were kept and used as primary sources to code categories and themes. The Indonesian transcriptions resulted in approximately 40 pages long, typed in single spaces. Each participant was provided with her/his interview's transcriptions via her/his email to crosscheck the transcriptions and to seek approval from her/his regarding the transcriptions.

After the coding process, the generated categories and themes were translated into English by the three researchers of this study. The content of the interviews was reviewed, analyzed and then categorized. After categorizing, the data were coded and themes were generated. These themes then were tagged and were used to describe the whole sentences. Drawing on this procedure, the themes under each category were compared to all interview transcripts in each department and then put them in the same group. In this coding process, 35 codes were produced with 5 categories and subcategories in the initial process of coding. As the process of sorting and refining went on, the number of codes was decreased to one or single general categories viz. (1) Predictors that influence the productivity in research and publication between academics in science and academics in social science. This general category has two specific sub-categories viz (a) Institutional factors which included: *research collaboration, early experience of publishing during postgraduate studies, the capacity and qualification of supervisors* and (b) Individual factors that consisted of *the capacity to find new ideas and topics; research style and communication*.

To give a clear picture of the methodology, the following is the schematic representation of it.

Results

Institutional factors

Research collaboration. From the interviews conducted, most academics in science revealed that they have been able to publish more in internationally reputable journals because they

collaborated with scientists abroad in the same fields or disciplines, as acknowledged by Dita, a female lecturer, from Mathematic discipline:

I have collaborated with a scientist from the Netherlands for five years now. We have co-published several papers in highly reputable international journals. In this collaborative research, we divided our tasks from collecting data to writing the final manuscript for publication. I usually had the task of collecting data, while my collaborator had the task of writing and refining the manuscript before submitting it to a target journal. I found this useful for and benefited me much, as it can expedite the process of publication and increase the rates of my international publication.

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The collaboration was also voiced by some academics from social science, although its number is not as much as that in science, as expressed by Fandi, a male lecturer from Art and Humanities “I had a foreign scientist colleague and I invited him to co-write a manuscript. He helped me to refine the English language and the contents of the manuscript. This is so helpful that it adds to my publication repertoires”.

The advantage of working together with foreign authors is predicated upon the chances to increase research impacts, as articulated by Vita from Mathematics discipline:

I like working together with foreign researchers as they have had wide experience in writing a high-quality piece of writing that can easily be accepted in high impact factor journals. My experience has taught me that publishing in such journals has added my citations. This is so great!

However, this does not apply with academics of social science who have received less or even none citations at a certain period of the year, as confessed by Fandi “I have published my articles in international journals, where one of which was a collaborative-written article with foreign researchers, but it has not received yet citations to date”.

An early experience of publishing during postgraduate studies. An early experience of publishing during the doctoral study was another factor mentioned by several academics to increase research and publication productivities. For example, the one raised by Vina, a female lecturer from Mathematics discipline:

It is easy for me to publish due to my previous experience of publishing during my doctoral study at one foreign university. From this experience, I came to know what and how to write an article for publication, for example, how to structure our argument to persuade or provoke the thinking of the editors and reviewers.

Nonetheless, not all academics had an experience of publishing during their doctoral study abroad, particularly those from social science. This condition contributed to their inability to publish when they returned to their home universities, like acknowledged by Imran, a male lecturer from English language discipline:

I spent four years completing my PhD. at one foreign university. At those times, I focused on writing papers for conferences. I produced some articles for conferences in some countries. However, such experiences contributed less to my ability to write a paper for journals, particularly international reputable journals. I need to spend some time now to learn how to write articles for journals.

The capacity and qualification of supervisors. Interestingly, some doctorate academics from science graduated from domestic universities were able to publish one to two articles during their doctoral study, under the supervision of their supervisors who have had a broad experience of researching and publishing, as explained by Santi, a female lecturer, from life science:

I was pursuing my doctoral study at one university in Java. I was supervised by my supervisor who has a large number of publications in international reputable journals. Under her supervision, I was able to finish an article to submit and was published in a life science journal. One of the leading journals in a range of life science' journals. I was so excited at that time!

However, this was not the case in social science. Although there were some doctorate academics graduated from domestic universities, none of them were able to publish in reputable international journals, as uttered by Lisna, a female lecturer from political science:

I completed my doctoral study two years ago, during those times, I did not publish articles in international journals. How could I publish if my supervisor did not have international publications either?

Individual factors

The capacity to find new ideas and topics. An interesting point was brought forward by Dita again, who confirmed that she was trying to be as innovative and creative as possible in that she was doing the research before which has not been commonly undertaken. In short, she has always begun research on new ideas. Dita expressed:

For me, conducting research is not just repeating other scholars'. I have always been trying to research new topics and ideas. This can make my research different from others' and may increase the chances of my articles being accepted by the target journals in my field.

Regarding the issue raised by Dita above, it provoked a question pertinent to how she could get new ideas or topics in conducting research? When probing further to this question, she explained that:

Well, it is really simple. For me, I simply develop communication with other colleagues in my department and other colleagues I met at national and international conferences. I usually discussed with them on a specific topic and indeed, I usually found new ideas and topics from that discussion.

Research style and communication. This issue was approved by other academics from social science. However, they argued that it was not just generating new ideas and topics to research into but there is a problem encountered by academics from social science when it comes to transferring the data obtained through writing for publication in international journals. This is because writing style for social science' journals are different from those of science'. Writing, structuring and composing ideas into a complete piece of paper was complex as it needed the art of describing, analyzing and persuading to induce others to accept the arguments and evidence. This was raised by Imran, again, arguing that:

I am aware of the importance of providing new ideas in an article submitted to international journals. However, the problem is not merely about presenting them to get the paper accepted and published. There is more than that. It is sometimes difficult for me to interpret the data as I had to not just describing them but interpreting them analytically to provoke thinking of others to accept the arguments.

Discussion

The situations depicted by Indonesia's academics from science and social science in this study reflect that individual factors play more as significant variables than institutional factors in determining the productivity of academics of science and social science in this study. Those individual factors cut across with the aspects of the capacities of academic individuals to find ways of collaborating, of publishing during doctoral studies, of having supervision with experienced supervisors in publishing, of coping with their subject areas or disciplines and of playing with new ideas and innovative minds.

Katz and Martin (1997) argued that research collaboration among scientists is strongly encouraged as it is helpful for the advancement of knowledge. The evidence yielded from this study reflected the efforts made by academics to develop foreign research collaboration. This can be identified from the emergence of the specific pattern of the collaboration of both

disciplines. While academics from both disciplines recognized the importance of developing collaborative research with foreign scientists to increase their publication and research productivities, there seemed to be a constraint in ways and forms of doing the collaboration that affects the form of collaborative patterns. Even, if academics of both disciplines were able to collaborate, its form and range were confined to only the same person of collaborator, as exemplified by Dita from science and Fandi from social science. Interestingly, social science seemed to have little chances or interests in collaborating with foreign researchers in their field, compared to sciences. This evidence is commonly in line with the finding disclosed by [Franceschet and Costantini \(2010\)](#).

It is interesting to note as well from this study that there was a similar pattern of academics both from science and social science concerning their roles and positions in such collaborations. Evidence from academics from both disciplines indicated that there has been an issue of the unequal division of roles or positions in the collaboration undertaken. Consequently, there emerged out two different roles of actors involved, namely supporting and leading actors. Academics in this study both science and social science are subsumed under supporting actors whose roles are providing and sharing data, whereas their foreign collaborators take on leading roles by writing and refining the manuscript. While this poses as an interesting phenomenon, unfortunately, this study did not find evidence regarding why this phenomenon occurs. It may be due to the factor of English language barriers that are mostly encountered by Indonesian academics as non-speaking English academics ([Gaus and Hall, 2015a, 2015b](#)) or simply due to their voluntarily agreed agreement. The latter needs further investigation.

Interestingly, indeed, the limited form of foreign or international collaboration has a positive impact on the receiving of higher citations, particularly for academics of science. This result is commonly in line with results reported by [Ductor \(2015\)](#) and [Lee and Bozeman \(2005\)](#) which stressed that the numbers and sizes of scientists involved in a collaboration do not correlate with research and publication productivity. Yet, this contradicts the research findings presented by [Jiang *et al.* \(2018\)](#), [Kyvik and Teigen \(1996\)](#), [Didegah and Thelwall \(2013\)](#), [Levitt and Thelwall \(2016\)](#) that emphasized that wider networks and wider numbers of co-authors may enhance research and publication productivities, particularly to receiving highest research impacts. It is important, indeed, to take into account the aspect of the status of collaborators' country of origin'. Collaborators of western countries may have higher impacts on articles published in that they are most likely to receive higher citations than collaborators from less-developed countries. This phenomenon has been addressed in research conducted by [Jiang *et al.* \(2018\)](#), [Didegah and Thelwall \(2013\)](#), [Gazni *et al.* \(2012\)](#). Following this, and linking this phenomenon to the condition of academics in this study, the higher research impact received by academics from science who collaborated with western counterparts may due to the country of origin (Western) of their collaborators, and this needs further investigation.

However, this is not the case for academics of social science. Even though they had chances to collaborate and publish manuscripts in journals with western scientists, they received fewer research impacts. This may be an indication that the impact of research collaboration on research and publication productivity for social science can be positive only when research impact variables are excluded. So, it might be concluded in a broad supposition that factors to research and publication productivity pertinent to international collaboration may have a positive correlation across disciplines but particularly have a negative correlation with research impacts for social science.

That is not all, there is an issue needs to be paid attention to, about the type of research collaboration developed by academics in this study. It is interesting to note in this study that there was a simple and easy type of collaboration held by academics with their foreign counterparts. Due to the distant geographical location among the collaborators, there was no

physical presence for both sides in researching in one location. Each of them remained in his or her home country developing research collaboration through exchanging ideas, data and English writing and polishing. Such a situation has been addressed by [Katz and Martin \(1997\)](#) who divided the type, motivation and impact of research collaborations among researchers. Thus, based on the result of this study, regardless of the number of collaborators and the type of collaboration, the collaboration between researchers may become a positive predictor of research and publication productivities of academics in this study both for science and for social science.

Another determinant to research and publication productivity yielded from this study is the effect of the locus (the status) in which academics pursued and completed doctoral studies. Academics of science in this study who graduated from domestic universities were more productive than those of academics from social science. In the meantime, when the predictor of the abroad universities was included, there was a mixed result for both disciplines. The returnees or graduates from foreign universities of science were most likely to publish more when they returned to their home institutions than those of academics of social science. This result corresponded with the results demonstrated by [Gu et al. \(2011\)](#), [Long et al. \(1998\)](#). From this point, it can be assumed that the locus or status of institutions/universities or affiliations both domestic and overseas may become a predictor of research and publication productivity for science in particular, and may not be so for social sciences.

However, it is interesting to note a particular phenomenon for social science in this study, where they tended to become less productive academics even though they graduated from foreign universities. Such a phenomenon is not new. International literature has identified such a phenomenon has also happened in the contexts of Korea and Malaysia. Research conducted by [Shin et al. \(2014\)](#) shown that the returnees of doctoral academics from the study abroad were much less productive than domestic degree holders. A similar result conveyed by [Conley and Onder \(2014\)](#) who stressed that there is no correlation between the prestige (top-ranked) departments, particularly the economics department to doctorate economic holders to their research and publication productivity. Thus, if one wants to become a productive research economist, they do not have to enter the top-ranked economic department ([Conley and Onder, 2014](#)). Nonetheless, Conley and Onder's premise stands in contrast with the research reported by [Bentley and Kyviak \(2013\)](#) stating that the effect of the status of institutions is stronger in western countries than that of non-western countries. So, why are academics from science holding foreign and domestic doctoral degrees more productive than academics from social science?

The answer to this question may be obtained from the result of this study that indicated that there is a crucial role of an early experience of publishing during doctoral studies and of the supervisors' capacity to shape early skills and habit of conducting research and publishing in international journals. In this study, academics of science, either foreign or domestic graduates had an opportunity to publish during their doctoral study. The research demonstrated that PhD students who published during their study may contribute to increasing their publication rates and may obtain a prospective future research career ([Horta and Santos, 2016](#)). The early experience of publishing during doctoral studies is not a stand-alone factor to doctoral students' future research productivity. There lies the role of a supervisor in shaping the early habit and skills of their students in research and publication. This is because supervisors can act as mentors or advisors to their students through the impartment of research values and knowledge. The evidence gathered from this research demonstrated that academics of science who were able to publish during PhD studies were guided by knowledgeable and experienced supervisors in publishing. As a result, they were able to publish in a high impact factor journal in their field. Previous research has shown that the capacity and qualification of supervisors are important variables to form and forge early productivities of students ([Williamson and Cable, 2003](#); [Paglis et al., 2006](#); [Gu et al., 2011](#)).

Viewing from this evidence, then, the predictor of an early experience of publishing during PhD studies has a positive correlation with research and productivity for a science discipline only if there is an intervening variable of the role and guidance of knowledgeable and experienced supervisors in publishing.

While the approach or theory of structural environment of research productivity (Fox, 1983) argued that there is a correlation between environment (location: the prestige of university and department) to research and publication productivity, the finding of this study demonstrated a contradictory result. Nonetheless, the result of this study conformed to the “accumulative advantage theory” in which it argued that early success or productivity accompanied by supports and rewards increased productivities (Fox, 1983). From this analysis, it can be concluded that early success or productivity in research and publication, intervened with the capacity and qualification of supervisors, has an association with research and publication productivity for academics in science.

On the contrary, academics of social science who had no opportunity to publish during their PhD studies were much less productive. The reason for this, as articulated by some academics of social science, is due to factors related to their inexperienced supervisors. Although many academics of social science graduated from overseas universities were able to publish, their publications were mostly in the form of conference papers which tended to be viewed as not prestigious forms of publications.

Bearing these in mind, the question now is, why were there foreign and domestic degree holders of academics from social science not able to publish during their doctoral studies? Academics from science in this study expressed some interesting points to consider to answer this question. Those interesting points were related to the individual capacities to deal with complexities of problems and issues within uncommon and conventional ways of thinking to generate new topics and ideas (Jaccard and Jacoby, 2010). Generating new topics and ideas through a new way of thinking requires the acquisition and comprehensive understanding of knowledge in the field (Jaccard and Jacoby, 2010). For academics of science in this study, being able to publish in reputable international journals has been the product of their intellectual capacities to make sense of complex issues into the generation of new ideas or topics. These new ideas and topics are then integrated with their ability to play with theories and concepts which are reflected in the analysis and interpretation of data obtained. To this point, indeed, academics of science have shown that intellectual abilities combined with thinking style, comprehensive understanding of knowledge may pave the way for creativity to occur which in turn it may contribute to augment research and publication productivity. Some research, for example, the one conducted by Kuncel *et al.* (2004); Rushton *et al.* (1983) reported that personality traits and intellectuality contributed to the academic performance in research and publication productivity.

Academics of science in this study also showed one way of getting new ideas and topics which can be obtained from attending international seminars, where they can meet and communicate with other scholars in the field. For academics of science, the individual capacity to conduct creative and innovative scientific research constitutes a predictor of their research and publication productivity. Such an aspect is absent from academics of social science.

In light of this, it would be important in this study to take into account the Sacred Spark theory in understanding and explaining the difference of research and publication productivity among different disciplinary areas of science and social disciplines. This evidence is in line with the individual characteristics or Sacred Spark theory that foreground the idea that creative personality contributes to the productivity of researchers or scientists. That this creative personality that makes scientists more productive than others. Bearing this in mind, the ability to develop new ideas and undertake creative scientific research is a predictor of research and publication productivity for science in this study.

Based on the data in this study, creativity in research has also been acknowledged by academics of social science as an important determinant to increase research and publication productivity. However, the nature of social science, particularly concerning research style and writing which needs a comprehensive and persuasive way of presenting an argument, may create a building block for them to be more creative and productive. This issue is closely related to the issue of “paradigm” that differentiates social science from science in understanding the nature of realities or the social world being investigated (Jaccard and Jacoby, 2010; Bryman, 2012). “Paradigm” is “a body of theory which is subscribed to by all members of the field” (Biglan, 1973, p. 201). Science is paradigmatic in the sense that it is driven by organized and agreed methodologies and methods used to simultaneously account for the phenomena being studied and define the kinds of problems that require further research (Biglan, 1973). Social science, on the other hand, is non-paradigmatic that is still struggling to establish a consensus on the paradigm. It is accordingly that academics from social science, although they realize and are aware of the importance of generating new ideas and of being creative researcher, the paradigm of their disciplines in which it requires complex, persuasive explanations and arguments to persuade and provoke others to accept the reasoning, has to some extent become a hindrance for them to become productive researchers. So, it is reasonable to draw a premise that the nature of paradigm may become

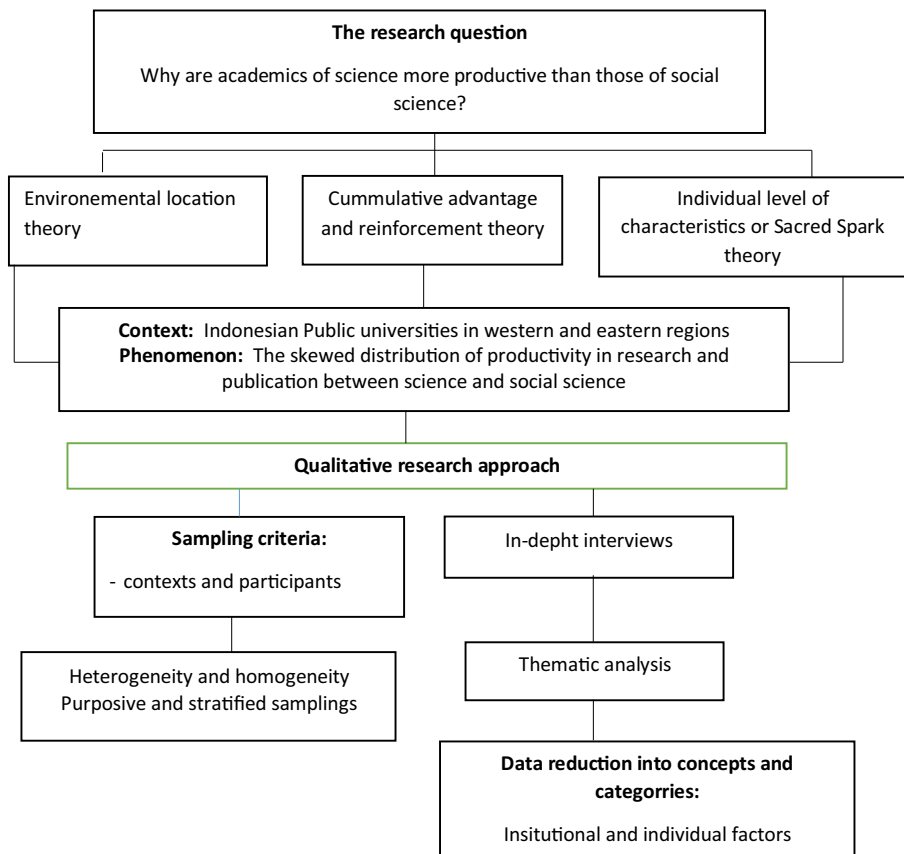


Figure 1.
The schematic representation of the qualitative methodology

the cause of the poor number of publications in social science, as acknowledged by Imran from social science in this study. So, it can be concluded that “research style” correlates negatively to research productivity for social science. On the contrary, for science, this correlates positively to research and publication productivity.

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Conclusion

This study has provided evidence regarding the causes or predictors of the skewed distribution of productivity, particularly in research and article publications in international journals among science and social science in four state universities in Indonesia. The results of this study demonstrated that the “puzzle” of determinants to research and publications productivities is present in Indonesian university contexts in this study. The major findings of this study construed that locations in this sense the background of graduate studies may become the predictor of research and publication productivity both for science and for social science. This premise can be true only if there are intervening variables relating to the opportunity of having an early experience of publishing during the doctoral studies, having scientific research training and developing a close relationship with qualified and skillful supervisors. However, these intervening variables may not work independently to produce productive academics without the presence of individual capacity. This capacity is helpful to internalize the values and norms of scientific roles imbued during the socializing process of doctoral studies under the supervision and guidance and supervisors. Furthermore, this capacity is also useful to help them alter these values and norms later upon returning to their home institutions.

From this study as well, it was found that individual characteristics such as talent and communication capacity to find new ideas and topics to conduct innovative scientific research are predictors to research and publication productivity for academics in science. Thus, it can be concluded that these can serve as distinguishing factors to the skewed distribution of productivity in research and publication for science and social science. Additionally, the aspect of research style and the communication style in presenting the findings of the research also become differentiating variables for the two disciplines.

Bearing all of these in mind, it is palpable that individual factors instead of institutional factors have more impacts on research and publication productivity. Although there are influential effects of location or institutions in which the socializing process of internalizing the values, norms and scientific roles under the auspice of qualified supervisors or advisors, there seems to be an individual capacity that comes in between.

The limitation of the research

Research collaboration can be said to directly correlate with research and publication productivity for either academics in science and social science. Collaborative research has been conducted with foreign collaborators and this could increase the productivity of research and publication of both disciplines. Unfortunately, this research did not find why academics of science receive higher research impacts when collaborating with western scientists as compared to academics of social science. Future research should focus on this single variable to deeply explore the impact of foreign collaborative research on research and publication productivity of academics in this study, including the impacts of such collaboration on the research impacts (citations). This study found an interesting phenomenon about collaboration with foreign scientists, where there emerged unequal division of roles or positions in the collaboration. Why and what factors have impacted on this are worthy of further investigation.

The implication of the research

This research has a contribution to practice in that the results of this study may be used by the human resource division of these universities in this study to revisit their existing standards and mechanisms of recruiting academics. Those mechanisms have long been based on the cognitive-based entrance examination, aimed to gain brilliant and intelligent faculty members assessed through their examination grades. While such mechanisms may disregard individual characteristics such as talent, creativity and innovation, new mechanisms for recruitment may focus on these aspects through the assessment of applicants' portfolios. For Indonesian policymakers, the result of this study may give a rudimentary indication of what needs to be considered in the future, particularly concerning the mechanisms of workshops in which to assist and facilitate academics for academic writing to publish articles in reputable peer-reviewed international journals. Furthermore, for policymakers in Indonesia and other contexts having similar conditions with Indonesia, the results of this study may also become indicators to take into account in structuring the mechanisms of assessing and evaluating the performance of academics by considering aspects of disciplinary differences.

In addition to the above-mentioned contributions, the result of this study may also contribute to the existing theories in terms of understanding more about the nature of the stratification in science. This is reflected in the skewed distributions of productivity in research and publication that have long been studied through the lens of Sacred spark theory and cumulative advantage theory. With this, this study, through its analysis of institutional and individual predictors revealing that there are aspects of individual scientists of academics in this study that may have overarching effects on other aspects of institutional attributes.

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