

Scientific Communication among Population Scientists in Indonesia

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Abstract

The purpose of this study is to explore the scientific communications among population scientists in Indonesia by the traffic of the scientific communications through journal types such as author productivity, authors collaboration, authors most frequently cited, journal most frequently cited, and age references most frequently cited. The object of this study are the article and its bibliography of the population articles in three-population journals: *Majalah Demografi Indonesia-MDI* (Indonesian Demographic Journal), *Journal of Population (JOP)*, and *Populasi-POP* (Population) which were published during the period 1990-1998. There were 172 titles of journal articles with 2,828 citations. This study has discovered that the most author productivity only publish one article in a year during the period 1990-1998. When writing scientific paper, there are 46 per cent authors are collaborating to each other and 54 per cent are single author. There are 38 population scientists most frequently cited during the period 1990-1998 and the four top ranks are Masri Singarimbun, Terence H. Hull, Aris Ananta, and Graeme Hugo successively. There are 18 journals most frequently cited and the top five are *Population and Development Review*, *Prisma*, *Bulletin of Indonesian Economics Studies*, *Demography*, and *Population Studies*. A large part of the literature age most frequently cited belong to group 00-05 years (47,2 per cent), followed by group 06-10 years (25,1 per cent), group 11-15 years (13,3 per cent), group 16-20 years (6,8 per cent), group 21-25 years (3,2 per cent), group 26-30 years (1,5 per cent) and over 30 years (2,9 per cent).

Keywords: scientific communication, citation analysis, population scientist, scientific journal, demographic training

1. Introduction

If you have an apple, I have an apple, and if we exchange these apples then you and I will still have one apple. However, if you have an idea, I have an idea, and we exchange these ideas, then each of us will have two ideas.

George Bernard Shaw

Shaw's thought above can be analogue as a simple understanding of scientific communication. However, it is common recognized that scientists does not stand-alone; it is embedded in the communities of the science. In spite of their work differentiated by specialization, they should be mutual communicated with other scientists both inside and outside specialization. In order for this formulation to be successful contributions to science, they must be communicated in such a form to be comprehended in verified by other scientists and then used in providing new ground for further exploration. Thus, communicability becomes a salient feature of a scientific product since its recognition by peers, as a unique contribution is essential to establishing a scientist's success in science.

Consequently, throughout a scientist's career dependents on the other scientists' evaluation of his work to achieve goals related to the advancement of his career—publication of research, research grants, promotions, etc. Yet, paradoxically, if a scientist is really creative and productive at the cutting edge of the research front, there will probably be only a small, select group (in-group) of other scientist who can truly understand the significance and appreciate the quality of his work. Each of these few, in turn, is dependent on the respect of other scientist in the in-group for recognition of his own success. However, each scientist must enhance his own reputation individually, even though he committed to the group. His commitment to the group has both an attitudinal and a behavioural component. As an attitude, it is expressed in strong positive feelings about the group, feeling of being a part of it and sharing its goals and successes in the progress of science. As behaviour, it is expressed in actions that share the burdens as well as benefits of memberships, e.g. a willingness to review manuscript fairly in order to maintain the integrity and quality of the group's of science.

Within this framework, it becomes clear why the communications amongst scientists has developed (in the hands of scientists themselves) into the complex and rigorously controlled the development of science today. The formalizations of the scientific communications process started over three centuries ago when the final step of scientific research customarily become the communication of its character from a private to a social activity restricted to the world of science.

It would appear then that scientists live in two worlds—a scientific world with its special norm and rigorous communication structure and a separate “outside” world (Garvey 1979). Scientist have maintained the isolation of their scientific world from the outside world since Galileo established the empirical basis of science and the resistance of the empiricism to outside opinions and dogma. Today, most scientific communications influenced not only by the inside and outside of science but also by the

globalisation (both information and embedded of global cultural) and local culture of science. This is an empirical basis of science and more influenced to the existence and development of science. In taking this perspective, it is hope to be able to demonstrate the intimate nature between active researchers' scientific communication behaviour and the behaviour inherent in their scientific creativity.

A history of tradition of the scientist's scientific communication had begun in West Europe since 16 century. At that time, their forms were private letter, informal discussion, invisible college and starting to create the embryo of "scientific journal". Through this way, scientific information distributed and exchanged between scientists. This tradition has motivated by the motto: **publish or perish** which belongings of their academic culture. This motto has also comes as one of the push factor supporting all scientists to always sharing their research through scientific journal. This tradition might be explain why western scientist now playing main contributor in the worldwide scientific journal. In 1994, from 3.300 scientific journal titles from all over the world collected by Science Citation Index (SCI), 30,82 percent come from American scientists, 7,92 percent from England, and 7,18 percent from Germany (Gibbs 1995). Fostering by that motto, their scientific work published in various scientific journal. This condition, however, forced scientist from developing countries completely dependent on western current findings of research.

This paper will explore the scientific communication among scientists, particularly population scientists in Indonesia, and attempt to compare with other countries in Southeast Asia region. Firstly, this paper will explain why population scientists in Indonesia need scientific communication, following by the brief theory of scientific communication, the data of scientific communication from Indonesia and its mean in the development of scientific communication. This paper also describes Indonesian position in other Southeast Asian countries. Finally, I explain the role of demographic training (DT) in enhancing scientific communication.

2. Why Scientific Communication

Indonesia is a very populous country and is the fourth largest country, after China, India, and the United States. A great number of population's face up some problems in many areas of welfare. However, the Government of Indonesia (GOI) has creates some efforts to overcome the population problems and has made it a high priority. The National Family Planning Coordinating Board (NFPCB) is an old government institution to implementation the government efforts to improving child and mother health's as well as to reduce population growth. The GOI also ever established a Ministry of Population (MOP). The main duties of this ministry are to create a strategic policy and implementation of the population program. Although currently the MOP is completely removed regarding to new policy in government administration, the government still seems facing in highest commitment.

In support of the GOI's effort, scientists in Indonesia perform the biggest interest for population problems. Indonesian population scientists creates institutions that have aims to analyse, monitor, and evaluate the population program policy that have been done by

the government or private sector. In 1964 a few population scientist at University of Indonesia established the Demographic Institute, Gadjah Mada University have created Population Research Center in 1973, and Institute of Indonesian Science also built the Population and Labour Research Centre. Even, in the most of the State University in each province established the Population Studies Centre (PSC).

Meanwhile, an attempt to improve skill and wide insight to research in population area, since 1980's University of Indonesia and Gadjah Mada University have opened postgraduate program for population studies. These two universities have a key role to running demographic training and have been done as a role to think out a good population analysis and produce population scientist.

The establishment of the research centre and education institutions for analysing population problems brings a great number of population scientists to the area. This phenomenon has flourishing demography and population studies in Indonesia. Research reports of population scientists will be published and disseminated through all types of document as well as monographs, journal articles, dissertations, theses, and papers. These ways will facilitate scientific communication among population scientists and could be quoted and referenced as a citation. A document of scientific works could be cited to other relevant and related documents. The intensity of scientist interaction through citation could be improving the progress of population studies. A finding of research, for example, could be discussed indeed to other document.

This description shows that in activities of research, a variety of types and characteristics of documents is needed by scientists. Scientists often need the scientific information, which relates to their research topics. This way aims to get information research from earlier related and relevant research, to foster a high quality of scientific work and to spur a productivity of researcher's scientific work (Diamond 1984; Lasa 1996; Tjitropranoto 1993).

Thus, in the activities of scientific works, population scientist works closely with document usage. According to Ziman who was quoted by Smith that a scientific work could not stand a lone, it exists in a scope of similar document subjects (Smith 1981). It indicated that scientists, in general and population scientists in particular, always cite whatever information those gets from earlier documents to enrich his/her paper or article. A reciprocal and mutual citation of documents enables crucial scientific communications amongst population scientists.

It demonstrates that population scientists need and must create an adequate scientific communication among them. The dynamics of scientific communication can be seen in citation. A crowded traffic of citation indicating the development of adequate scientific communication and then affects on rapid growth of science. The more smooth of citation traffic, the most adequate and rich of scientific communication. On the contrary, the more rare of the citations traffic, the most inadequate and poor of the scientific communication. Thus, citation becomes a heart on the dynamic of scientific growth.

Citation is an annotation scientific paper that uses a bibliography on the article or book it is usually attach at the end of article or book. The concept, which citation appears, was based on principles that there were a significant correlation between one document (citing) and the other documents (cited). It is a consequently a generic principles in written of scientific paper. A scientific paper should be embodied by the bibliography. The bibliography is a list of documents we use in scientific papers. Hence, the bibliography should be linkage to the content of scientific papers. This bibliography brings to vivid scientific communication of population scientist as well as the development of population studies.

A very populous country with still in growth rapidly, concern and commitment of the government political good on population, the established of research institution which flourishing demographic training at the postgraduate level could be a base power to running scientific communication on population field. This scientific communication not only enhances population studies but also can help policymaker and program manager to create and implement effective and useful population policy and program on population field. Thus, scientific communication is a heart and basic mechanism for the existence and development of science. The progress of science often measured by the traffic of scientific communication, accordingly.

2. Scientific Communication: a brief theory

Communication is the exchanges of information between individuals by means of a common signal system (e.g., spoken words, gestures, or writing). Mikhailov (1984) defined scientific communication as the combined process of presentation, delivery, and receipt of scientific information in human society. While scientific information is logical information received in the process of cognition; it adequately reflects the phenomena and laws of nature, society, and thought and is used in socio-historical practice.

The processes of scientific communications form the basic mechanism for the existence and development of science. Mikhailov describe the main processes of scientific communication as like:

- (1) Direct dialogue among scientists about research or development in which they are engaged;
- (2) Visits to colleague's laboratories, scientific/technical exhibitions, and the like;
- (3) Oral presentation by scientist in lecture halls;
- (4) Exchange of letters, preprints, and offprint of publications;
- (5) Preparation of the results of research and development for publications, including the choice of the form of publication (letter to the editor of a journal, manuscript for deposit, article in a journal, report, presentation, patent claim, rationalization proposal, survey, monograph, or textbook) and the place and time of publication;
- (6) Editorial/publishing and typographic processes;
- (7) Distribution of scientific publication;
- (8) Library/bibliographic activity and manuscript work; and
- (9) The scientific information activity (collection, analytical, storage, searching, and distribution of scientific information).

The scientist takes parts in all these process of scientific communications. The degree of participation depends on the specifics of the particular process. For example, the scientist undertakes the first five processes listed. However, for several of the other processes, the role of the scientist decreases with time.

The psychology of scientific communication emphasizes the interaction between the scientist and their environment. Each scientist brings to each situation a particular cluster of psychological attributes (personality, skills, style, experience, habits, etc.). Its combined with specific circumstances in the research process, gives the individual scientist a predisposition to perceive and detect, to assimilate, to associate, etc. what is happening with his research at any given moment. Consequently, given identical circumstances in the lab, two scientists may perceive them differently, assimilate different information, or apply the same information to fulfil individual needs to advance his particular research. Hopefully, an understanding of this overall process will provide more general grounds on which the information specialist can meet the scientist's need, advice, and assist him in his "continual" pursuit of information.

Scientific communication is intimately tied up with the creation of information that evolves slowly. As time passes, however, newly created information is integrated with other information and evolves into more general knowledge, understandable by a wider range of scientists and non-scientist. The role of scientific communication amongst scientist, accordingly, concerning to the work that they are produce, evaluate, disseminate, and utilize in their capacity as researchers and the multiple roles information-exchange plays in the development of scientific knowledge.

There are two parts of process in the general scheme of the system of scientific communications such as informal processes and formal processes. Those processes that are carried out essentially by scientists are part of the informal processes of scientific communications. Several researchers claim that a significant part of scientific information is transmitted via these informal channels and that channel functions considerably faster than the formal ones. According to the data of M.H. Halbert and R. Ackoff, as a quoted by Mikhailov, approximately one-third of all scientific information is transmitted via the informal channels. Other data discover that 55 percent of all scientific information requested by scientists and engineers are received through informal channels (personal contacts). Chemist and biologist use formal channels more often than physicists and mathematicians. Carlson studies that are quoted by Mikhailov, summarizing that in searching for information necessary for scientific research and experimental construction work, the engineers turned first to informal channels. Its has about 70 percent of the cases and received, for the time they had at their disposal, more necessary information than those who first turned to formal sources.

Informal processes of scientific communication offer certain advantages that are practically impossible to attain via the formal processes. During personal contact among scientists, there may be an inner subtext to their exchanges, an emotional colouring. The general atmosphere of conversation and speeches, the direct reaction of the audience, and the mimicking and gesticulation allow the listeners to evaluate better the ideas

presented, to grasp the intricacies of the study and the persuasiveness of an argument. Sometimes, with personal interaction, the synthesis of information necessary for the formation of new ideas is completed more actively than during the mastery and reworking of a printed text. In addition, certain details exist, primarily in the applied disciplines that are difficult to write about it. In certain cases, it is easier to show how some apparatus functions than to write about it. In the English language, the phrase *know-how* is used to designate this type of information.

While recognizing the great value of research on the informal processes of scientific communication, the indisputable values of such processes, and the importance of their perfection for raising the effectiveness of the system of scientific communication as a whole. We would like to emphasize the danger of a one-sided approach to this problem. One must not forget that the informal channels, isolated and without an organic connection to the entire system of scientific communication, have essential shortcomings. Because the sphere of their dissemination is limited to an extreme degree, there is no control over the value of scientific information --its objective character and truth--sent through them by social mechanisms. Oral channels of information dissemination do not permit verification of the information's validity or its accumulation for subsequent processing.

In evaluating the role of the informal process of scientific communication, one should not forget that science in its contemporary form would have been completely impossible without scientific documents and the whole system of their dissemination--the formal channels. Interaction among scientists and specialists can only be effective as long as it is based on the knowledge each of them has invested in science. The social system of science is based on the system of scientific publications, at the bottom of which lies the mystery of the transformation of the discoveries and elaboration of individual scientists and specialists into combined scientific knowledge.

The exchange of scientific information via the scientific literature is related to the formal processes of scientific communication. In these processes--editing/publishing, typesetting, printing, dissemination of scientific publications (including the book trade), library, archival and bibliographic work, and the scientific information activity--the roles of scientists, specialists, and lab workers are steadily declining. Note that no one formal process, except the scientific information activity, pertains to scientific communication. In a system of scientific communication, books occupy a special place, since they are one of the most ancient means of preserving and communicating knowledge.

The scientific journal, a new and unusually effective means of scientific communication in the seventeenth century, arose from this completely formless beginning and then from a more regular exchange of letters. The scientific journal arose as a means of disseminating information about new achievements. The primary function of the scientific journal is that of providing a vehicle for the dissemination of information rather than as a repository for the storage of new scientific ideas. At this time journal is the chief means of communications among scientist.

3. Scientific Communication: data from Indonesia

As above mentioned, there are two parts of scientific communication: informal and formal processes. Essentially, scientist carried out the part large of the informal processes of scientific communications. Even, some scientist claims that a significant part of scientific information is transmitted via informal processes. To study the informal processes need a combined of qualitative and quantitative approach. This study employs document approach. Thus, this paper use formal processes of scientific communications with journal article during the certain period is a based data.

As stated before that one of the formal processes of scientific communication is an article in journal. The scientific article in journal is vital to the scientific community. Journal are formal in the sense that article manuscript have been reviewed, revised, to near perfection, and then allowed to pass into the formal domain where they may be explicitly cited and unambiguously retrieved. In almost every discipline today, the socially accepted medium for establishing priority is the scientific journal article. Every scientist, especially the young scientist, is under social pressures as he pursues his goal of becoming a significant contributor to scientific knowledge because the merit of his work is based on his peers' judgement of its quality and originality. For this reason, scientific article used as a data in this study. This data may not be representative and not a good data to proximate the processes of the formal scientific communication but that is the fact and recently available in Indonesia.

3.1 Criteria of Data Source

In getting an adequate data source and reliable scientific journal to analyse, we create set criteria to determine the journal source. There were six criteria to be met. First, the journal has an ISSN. Second, the journal is scientific. Third, the journal has been consistently. Fourth, the published articles of the journal have fulfilled the law of scientific writing. Fifth, the journal has published by the population institute or associate of population scientists in Indonesia, and sixth, all scientists could submit an article as long as suitable to the journal's mission.

3.2 Collecting Data Method

First, we approach the data collection using the document method. The first step of this method was searching the scientific journal title in the field of population that has included at the List of Indonesian Occasional Journal Title having an ISSN that has publish by Indonesian Institute of Sciences. From this step, we found twelve-journal title in the field of population.

The second step, synchronize twelve-journal title with above six criteria. The result of this synchronizing was three scientific journal titles in the field of population were published in 1990-1998 period. The title of those three journals were MDI, published between 1974 and 1993, JOP which has been publishing since 1995, and POP which has been publishing since 1990. Those three journal issued biannually or twice in a year. Those three journals elected to become the data source of the document could be analysed.

3.3 Results

3.3.1 Number of Documents Cited

The quantity of documents cited per article for each journal source has much variation. The number of citation per article for MDI ranges from 1 to 53 citation. Whereas JOP ranges from 4 to 64 citation, and POP. ranges from 2 to 55 citation. Beside difference amount of ranges per article, a large amount of citations per journal source demonstrated differences.

Table 1 displays in detail the number of citations from the three journals source. Both MDI, JOP, and POP have biannual journal so that they were periodically published twice a year. The difference of the number of document cited from these journal probably occur on their differentiated year of publish during period 1990-1998. Actually that MDIs published since 1974 until 1993. Its mean that during the period 1990-1998, only four years or eight edition to be taken as the document source of this study. Closed of MDI, JOP has publish in 1995, and its mean that only four years or eight edition to be taken as the document source of this study. Whereas POP publish since 1990 until now, so that the number of year publish to be taken of this study reach nine years or seventeen edition (second edition of POP in 1998 year couldn't be part study because they are not published yet).

Enticing information from Table 1 that the average number of the document cited by journal published in Indonesian lower than English. The article of MDI and POP published in Indonesian language. MDI with 35 total articles has citing 587 citation or average 16.7 citation per article and 15 citations per article for POP. It means that the difference of citation average for MDI and POP was below 0.55 point from total average (16.4). On the contrary, the difference of citation average for JOP which publish in English reach 3.4 point after total average. Thus, the average number of citations for English article was more than Indonesian article.

Actually, now there is a way to determine the maximum or minimum number of document cited for an article or paper. However, it is assumed that more or less document cited on an article or paper indicates narrow or wide reference to document reads or analyze to create an article or paper. Besides, this condition depend on scope and theme the article and whether it is a new or old of field study. The older the article theme, a greater document availability to be cited. Whereas, new theme of the article might be lack of document availability to be cited. Some reason wherefore an author unquoted the related previous document such as no information exist of sources of document, author has knowing the document but its difficult to getting, and the language problem when relevant document used other languages of an author's languages. This phenomena will be impact on document cited. It means that the available of the adequate and relevant document will be suport on scietific paper writing.

According to the data in Table 1 we might hypothesize some possible causes more and less citation in an article or scientific paper. *First*, internalization of previous readings. The term of internalization to be taken from Sigmund Freud's concept of internalization. Freud has defined internalization as prohibitions or roles which previously came from parents (to children) and then processing in a such a way for a long time, and the latest these prohibitions and roles come from her/himself (Freud 1986). If we adopt internalization concept of Freud in the above problem of citation, internalization of previous readings mean that readings or speakings which previously come from scientific works (book or journal) or speaking of previously prominent leader and then continuous processing in a such a way that the latest come from readers or listeners. Since this readings or speakings has been internalization process of the author then assume it belongs and (that is the problem at hand) the author unnecessary to cite original authors or speakers.

If we were pointed out this phenomena furthermore then we are standing on a new hypothesis that its fact to indicate that the author's missing or lack of knowledge about citing especially when they will be citing or not. Concern in this context, we must be back to Weisntock's opinion about reasons author could be citing other authors. According to Weisntock (1971) the reasons for citing are to give appreciation for the previously scientific works and to pay respect for related and relevant subjects of its. It means that in spite of the knowledge had been internalization process, absolutely to citing previous readings or speakings that has made the idea. The new idea of this must be thanks to old idea. This process making rapid growth of science. Thus, regarding to internalization, the authors doubt to cite those document as an evidence of its honor and respects.

Secondly, it is difficult to access a relevant document. The author might be heard or known there were relevant document to its research topics, but they cannot access the document with any problem of accessing. This possible included when the author has not yet know the tools as a medium to searching and accessing source of relevant information of their research topics. Thirdly, research topics are a new issues in that subject so that no relevant document to support it. Fourthly, assumption of the author that with the limited number of document had been adequate to support their research writing. Lastly, the authors do not yet understand the roles and natures of citing, as well as when must be citing and not.

3.3.2 Author productivity

Author productivity should be count from three journal source. All authors should be ranked by total of their article that has published in three journal source, accordingly. Table 2 shows that the most productive author placing together by Sukamdi and Faturochman that published 8 article during the period, following by Masri Singarimbun and Muhadjir Darwin. This table also demonstrated that 22 of 237 authors has published 2 article during the period of 1990-1998.

It means that the most productive author in population field in Indonesia only publishing eight article over a period of nine years or publish only almost one article in

a year. While the author less productive only published one article over a period of nine years. When analysis by journal source, it turned out that from first to sixth rank has come from the author that has published their article to the POP journal. One author in POP journal could publish eight articles during the period, while in two other journal (MDI and JOP) the condition seems sufficient scattered, three article for one author. Aris Ananta, for example, published three article to MDI journal during the period of 1990-1993. Both Sukamdi and Ananta just publish one article over a period of one year.

The different period of time to publication making differences of author productivity. In this study, the POP journal have more period time to publication than two other journals. The data from POP journal taking nine years period time to publication, whereas two other journals only four years. Due to this condition the possibilities to publish article in POP journal have many more times than two other journals. Besides that, there were tendency that scientist from Demographic Institute University of Indonesia (DI-UI) tend to published their article in MDI and JOP journal that has publish by their own. This tendency also come up to the POP journal that is the large parts of the authors come from Center for Population Studies, Gajah Mada University (CPS-GMU) that has publish by their own.

3.3.3 Author Collaboration

Scientists do not work in isolation. In a very general sence, all scientists are member of a world-wide community working together to probe and understand the mysterius of nature. Collaboration is a miniature of scientific communication. Scientific collaboration is the formal acknowledgement of joint research or writing. Scientific collaboration have taken place when two or more authors work together on writing the paper and contribute resources and effort, both intellectual and physical.

Table 3 shows that during the period of 1990-1998, there were 46 percent of author having collaborated to each other, and other 54 percent haven't collaborated or to be a single author. Its mean that population scientists in Indonesia tend to write alone their scientific work or be a single author. Collaboration is very important in scientific works because in collaboration each of participated scientist giving mutual interaction to each other and share their idea to improving the quality of their scientific work. Of course, if this activity in interaction and sharing of knowledge has been done continuously, it could get a significant impact on add the intelectual assets. This activity, however, doesn't occur in the single author's scientific work. Unfortunately, this study couldn't see the types of scientific collaboration such as lecturer senior-yonior, lecturer-student, inter-student, national-international scientists or inter-institute collaboration.

3.3.4 Author most frequently cited

In writing scientific work, each Indonesian population scientist cited previous scientific work that has been publish on various document types by other population scientists. From Table 4, we can see that 19 of 957 authors cited more than nine times during the

period of 1990-1998 from three journal source. Masri Singarimbun cited 32 times occupied first rank, following by Terence H. Hull that has cited 23 times in the second rank, Aris Ananta that has cited 22 times in the third rank, and Graeme Hugo that has cited 21 times occupied fourth rank. From the top four rank, two population scientists from Indonesia and the two other from abroad (Australia). Masri Singarimbun is famous population scientist from Gajah Mada University and Aris Ananta from University of Indonesia. While both Terence H. Hull and Graeme Hugo is prominent population scientist from Australian National University of Australia. Why population scientist from Australia prefer to cited by Indonesian couldn't be explore in this study. It is need to explore in the next studies.

If we compare this data of author most frequently cited (table 4) with the data of author most productive (table 2), this study find that not all of the author most productive is also author most frequently cited. From 10 authors most productive during the period of 1990-1998, stand at only three authors with also occupied top 10 rank of author most frequently cited at the same period. They are Masri Singarimbun (3-1), Tadjuddin Noer Effendi (8-9), and N. Haidy A. Pasay (10-10). Masri Singarimbun occupied third rank for author most productive and first rank for author most frequently cited, while N. Haidy A. Pasay placing together 10th rank for both author most productive and author most frequently cited. On the contrary, Terence H. Hull and Aris Ananta that occupied top ten rank of the author most frequently cited only included on top 20th of the author most productive during the period of 1990-1998. It means that the author most productive don't be too sure produce significant scientific article to be cite by other scientist. On the contrary, the author that has only produce one article with highest quality could become to the most frequently cited by other scientist.

At least, there are six possibilities drives scientist's scientific article become to the most frequently cited by other scientist. First, the scientific authority or experties accredited in the certain field of science. Second, highest quality of the scientific article. Third, highest productivity in publish scientific article. Fourth, widespred distribution of the publishing media (journal, monograph, ect). Fifth, the author writing the mainstraim of population studies. Sixth, the author is the pioner to develop certain theory in population studies (fertility theory, mortality theory, mobility theory, ect.).

3.3.5 Journals most frequently cited

Keyfitz (1993) in his study for thirty years of *Demography* found that journals are the chief means of communications among scientists. Citations in journals are a sign of a readership that not only understands what it reads but also uses it in its own subsequent work. Van Dalen and Henkens (1999) studies found that 64 percent of the articles published in demography journals are cited at least once in the first five years following their publications.

In this study, journal is the second rank in literature form that is often cited by population scientists. There are 735 citations for journal or 26.3 percent of total citations. The number of journal cited is 325 titles. Out of the 325 titles, 83 titles that are

cited more than once, 35 titles that are cited twice, 10 titles that are cited three times, 10 titles that are cited four times.

Table 5 indicates that the *Population Development Review* is the most frequently cited journal by the population scientist in Indonesia. The *Population Development Review* journal is cited 42 times. If we further study in the *Population Development Review*, it turned out that it has high rank for three source journals. The *Population Development Review* journal ranked first for MDI, with citation frequency eight times, second rank for JOP with citation eleven times, and fourth rank for POP journal with citation frequency thirteenth times. The *Population Development Review* even becomes a pioneer journal in demography, especially for population policy development. This journal has been published since 1971 and until now is still consistent with its mission in producing various scientific writing in population aspect from demographic all over the world.

Prisma is a second tier journal that citing by most scientists in population studies with citation frequency 40 times or only differs two citations with *Population Development Review*. However, MDI, did not cite the *Prisma* journal for the period of 1990-1993. *Bulletin of Indonesian Economic Studies* is a journal that ranked third with total citation frequency 32 times. Base on journal count, *Bulletin of Indonesian Economic Studies*, ranked second for POP and MDI.

Generally, out of 28 journals those are cited more than four times, there are 14 journal titles that specifically discuss population topics, there are six journals that discuss economy, and eight journal titles that discuss health, social problems, and labour force. Thus, economic, health, labour force and social problem have close relationship with the population topics. This relationship may be represented by three top rank journals that are *Population Development Review* (population), *Prisma* (social problems), and *Bulletin of Indonesian Economic Studies* (economics). This data shows that the population studies in Indonesia are close related with the problem of economy, labour force, health and social problems.

This data also shows that there are only six journals (21.4 percent) published in Indonesia. Meanwhile, 22 other journal titles (78.6 percent) are published outside of Indonesia. The six journals titles published in Indonesia are *Prisma*, *POP*, *MDI*, *Warta Demografi*, *Bina Sejahtera*, and *Ekonomi dan Keuangan Indonesia*. In other words, most Indonesian demography scientists cite the journals published outside of Indonesia. This is presumably due to the number of population scientific journals in Indonesia being inadequate. It is estimated that the citation of journal will increase if the number of the population journal published in Indonesian is sufficient with wide distribution.

3.3.6 Age of the Most Frequently Document Cited

The definition of the age of the literature is the period between the citation of the publication year of the literature and the publication year of the literature cited. The age of all literatures categorizing based on five-year periods. The oldest literature of MDI is 40 years, JOP is 75 years, and POP is 66 years. All of them are in monograph forms. It

means that the possibility exist monographs to be cited is longer compared to other literatures. Table 6 presents the age of literature citation.

In Table 6, it can be see that literature age less than ten years is often cited by population scientist in Indonesia. Most (72.3 percent) of the literature age that has cited is less than ten year. The rest (27,7 percent) of the literature age is more than ten years. It means that population scientists in Indonesia tend to cited new literature. There are many reasons to cite old and new literature. The reason spread out related both the quality of the literature, the development of science and access of scientific information. However, generally accept that citing new literature showing the dynamic of science and the novel or newest aspect of the article. In the literature theory, a literature has out of date when newest theory available. This study also reveals that the age distribution for monograph and journal above 20 years is still high. This indicates that the topics discussed in the monograph or journal within 20 or 30 years ago are still relevant to be discussed in contemporary research (1990-1998 period). This is presumably due to the population scientists in Indonesia only cited the existing available literatures or those available in older libraries. Meanwhile, the access of the current development of the knowledge restricted due to budget constraints and the lack of access for newest research information sources. Accordingly, even though there are newest theories in population studies, it cannot be used by the population scientists in Indonesia because probably they have not information regarding the developments.

4. What does it mean in scientific communication?

Due to the above data, our interest question that has crucial to analyse is what does it mean in scientific communication. Author productivity indicating the frequency or the intensity of population scientist to share and distributed their research findings. The more productive of a scientist to publish his/her research findings in the journal, greatest his/her contribution to enhancing scientific communication.

The above data of author productivity shows that population scientist in Indonesia has relatively less productive to publishing their scientific work in the journal. It means that their sharing of knowledge is insignificant. In spite of that, however, no one absolute criteria how many scientific article should be produced by a scientist in a certain period. However, the most productive of population scientists in Indonesia only publish one article over a period of a year that can be seen in Table 2. Sukamdi publish 8 scientific article over a period of 9 years (1990-1998) in POP journal that has manage by his institute. Aris Ananta publish 3 scientific article over a period of 4 years (1990-1993) in MDI journal that also has manage by his institute. Basically, the tendency to publish scientific article in the journal that has manage by themself is less support to fostering the dynamic of scientific communications. However, there are tend to less serious an effort to sellect the quality of scientific article that will be publish in own journal. It is differ if the scientific article send to other scientific journal. Scientific article that send to the scientific journal, however, absolutely reviewed by reviewer of the scientific journal and compete with other scientific article as a competitor to be issued in the next volume of that scientific journal.

Back to the data of author productivity, why the Indonesian population scientist less productive to publish their scientific article to the scientific journal? Some facts tells that during the period of before and after 1990, a great deal of population research have done by both DI-UI that has published MDI and JOP and PSC-GMU that has been published POP. Of course, it is following by the findings. The findings of those population research is a good issue to develop as a scientific article and sent it to the scientific journal. This phenomena give a clear state that the culture of scientific communication through journal not a good running yet. There hasn't been a good intentions to pass around the research findings by the journal. Instead of research report, the journal have a widespread distribution. With this behaviours, the quality of that research that had done comes up a big question: did it have a good quality? Publication of those research findings in the journal, basically, should be eliminate this question because the journal article could be reviewed by reviewer and other population scientists, and then evaluate it.

In the other hand, some facts also find that the quality of scientific article that has sent to the scientific journal had not a good yet. Drs. Harisusanto, a chief editor of *Atma nan Jaya* journal stated that the quality of scientific journal that has been comes to the editor desk of the *Atma nan Jaya* journal was very low. In order to publish, large parts of this article have to rewrite. While Prof. Dr. Sapardi Djoko Damono, professor of UI revealed that in the circle of lecturer atmosphere, that should create and publish a scientific work, most of the time spent to various activities in outside of academic environment. As consequences, the activity to write and publish scientific article that aims to develop science and technology was heedless. Journal publishing as a vehicle to drive scientific communication and at the same time as a measured standard of the progress of science and technology in the university environment has heedless simultaneously (Darmono 1996).

Most experts on education in Indonesia worried on heedless and culture to do research and writing in academic atmosphere that involved lecturer and student in the university but can not make a clear best decision and significant to implement. There are many suggest recommendation done to enhancing research, but nothing to make changes. Why it happened? It might be that those activities do not touch the main problem.

Prof. Dr. Anna S. Soeparno, member of Research Council of Indonesian Higher Education and Dr. Arief Purnomo the scientist from Indonesian Science Institute said that the number research in current ten years has sharp increase. A large research funding comes from Highest Education Directorate and National Research Council (*Suara Pembaruan*, 10/04/1999). More research has done, even though concentrated in such universities like University of Indonesia, Gajah Mada, Airlangga, Bogor Institute of Agricultural, Bandung Institute of Technology, and government research institution. The question is what happened and where is the results? It is unfortunate that the results of the research often stop over at the research report, unmanaged filing and slipping into the mists of time. Are there indicate the low quality? There is no state to answer it, since the results only collected in place that difficult to access. If the has a highest quality, it should be publish in the scientific journal. Unfortunately, it is nothing to do for that. Are there any other reasons?

Generally, scholars accept that research for most of the lecturer in Indonesia is the activities to have income generated, not to getting contribution to the progress of science. The lecturer salary is low, and need to generate their income. Other motivation, of course, is to increasing the lecturer position. From the research report, they have 5-credit point. In case of they are writing a scientific article from this report and thereafter published in scientific journal, they have 10 to 15-credit point. (Compare it with teaching one subject in one semester only getting 2-credit point). Since the publication of scientific article in the international journal is very difficult, most of the lecturer publish their article in local journal, with commonly manage, publish, and read by their self, as so-called a “masturbation” publication.

Besides that, there is new interest phenomenon from the development of the newspaper opinion desk. Famous newspaper likes *Kompas* and *Suara Pembaruan* come up to journals competitor since their opinion page tend to publish article with close-high quality of scientific atmosphere. It is appear since most scientists, including population scientist, competing to share their notion through the newspaper. There is an attractive reason why scientist tends to send their article in newspaper instead to the scientific journal. The main attractive reason is both increase of income generating and time spent to writing an article. One article published in *Kompas*, for example, could get both minimum honoured of Rp500.000 (equivalent to US\$50.00), a great things of generated income for Indonesian scientist, and only need some days to complete it. In the contrary, the publications of one scientific article in the scientific journal could not getting generated income, spent more than one or two month to complete it, spent more money to deposit to the editor and spent more time to “hermit” in the library for literature review and make a good analysis.

How about author collaboration? Author collaboration can be seen the tremendous participation of scientists in interaction and working together with other scientists. This effort could be seen as an impact on sharp-witted analysis and ideas of a research problem. It is occurs since in collaboration can absorb combine opinion from any other scientist involving in the collaboration. Exchanges ideas, of course, realized with benefit to not only additional insight of participant scientists but also making a highest quality of the scientific collaboration work. The more high of the author collaboration rate, the more huge of the scientific communication influenced by the collaboration to development of the science.

From the data of author collaboration that was presented in Table 3, we may say that our rate of coloboration was moderate since 46 percent of all the author was collaborated to writing scientific article, eventhough there are a huge amount of 54 percent of them still on a single author. This condition, however, is a good starting to create scientific communication. As stated above, author collaboration is a simple form of scientific commnunication. Collaboration should be build up from research institutions, particularly in conducting a wide survey that was impossible to carried out it a single one scientist. It means that research collaboration could play as an agent to formulate a formal scientific communication. Therein, writing together of scientific work and publish it in local, national, and international journal might be employed.

Thereby, an effort to mutual exchanges of idea to sharp-witted analysis of scientific article can be dynamic and be a high quality.

Author most frequently cited shows five matter. First, to whom a scientist bail out its science. Second, it could be seen the scientist capacity to enrich their field of interests. Third, it could be seen the scientist capacity to accomodate other research discovery in their field of interests. Fourth, it could be seen the motivated and scientist desire to know more the progress of their filed of interests. Fifth, it could be seen the scientist giving appreciate to honor the previous scientific work, both in their field specialist and relevan-outside. In scientific communication, the data of author most frequently cited giving a valued contribution to see the most influenced scientist in such field and to see hot paper and core scientific article in certain field of science.

From the data author most frequently cited presented in Table 4, we can see the pattern of formal scientific communication is interested. From top10 authors most frequently cited, five of them are from Indonesia and five others from outside Indonesia. It is can be seen that there are balance acomodation by Indonesian scientist from both abroad and local scientists. Even though that the development and progress of such science does not influenced by borders of country, it should be recognized that author that cited by author form outside of his/her country shows that his/her quality of scientific article is very high. From this point of view, there are two things that has been occur with different implication. First, abroad scientists or author studies the case in his/her country and thereafter published it internationaly (by English) that enable population scientists from Indonesia read it and thereafter cited by his/her next scientific article. Second, abroad scientists or author studies Indonesian cases and thereafter publish in Indonesia (by Indonesian language). As regards of author most frequently cited, the implication of that two things is differ.

From this phenomenon, what Indonesian population scientist can do to become the author most frequently cited? Some programs, efforts, and activities need to do. It should creates any efforts and activities of how population scientist in Indonesia write and publish qualified scientific article so that cited by most scientists. Its mean that Indonesian population scientists should be: produce qualified scientific article, published it in international core journal on population studies and worldwide distribution. With this effort, it is probably to cite by all population scientists in all over the world. But, in case of writing and publish scientific article in Indonesia and use Indonesian language, it is probably to cite only population scientits in Indonesia or scientists understading Indonesian language. In addition, this data also presented language capacity, particularly English language. Since most international journal use English as a medium, it shoub be assume that English capacity of Indonesian population scientists was quit good.

The journal most frequently cited data give much contribution to know core journal in population studies that has most references by populationists and thereafter most frequently cited. Core journal has a key role as a center of references and foundation of scientific communication simultanuously. Thus, there are reciprocal-related between author most frequently cited and journal most frequently cited. From Table 5 we can see

that citing behaviour of Indonesian population scientists to the journal was a good condition. Fifth scientific journal most frequently cited by Indonesian population scientists are *Population and Development Review*, *Demography*, *Population Studies*, *Studies in Family Planning*, and *Family Planning Perspectives*. Those journals are also parts of 17 journal most frequently cited by world population scientists issued by Institute of Scientific Information (ISI), Philadelphia, United States. Even *Demography* that has taking place at a first rank of journal most frequently cited by world population scientist, also taking place at a fourth rank of Indonesian. Pasquariela's (1981) research also discovered the same pattern of journal citation.

Unfortunately, journal publication, including population journal in Indonesia currently appear a sadness phenomenon. Most journals are simplicity publish, and even are only publish one or two volumes and thereafter stopped, not to continue. In addition, most of that journal publishes by certain group with poor editing, review by themselves, limited distribution in-group, and produced totally aims to add credit point in enhancing their position. With this condition, we cannot do anything in exchanges information of science and technology and to compete it in the global era with most the characteristics are on rapidly changes.

Yet, behind the less quality and simplicity publish of the journal, the phenomena of the academic journal growth in surrounding highest education is a quite good. At least, youngest researcher and lecturer have a medium to do scientific communication. Frankly, there are a few journal that published in Indonesia is a quite good to seriously developed as a medium of scientific communications. Study about the effectively of health journal in Indonesia, for example, presented that from 66 scientific journal in health published in Indonesia, 44 of them categorized "very good" with suitable to the set of research criteria.

Other barriers are, until today we have not a clear data of how many scientific journals exist in Indonesia. From the side of ISSN (International Standard Series Number) point of view issued by the Centre of Scientific Information Documentation, Indonesian Institute of Science (PDII-LIPI) we did not have a clear data to set apart on scientific or non scientific journal. Based on 1995 annually report, up to 1994 there are 516 journal having ISSN. This number covered all temporary journals in general, popular, and scientific category. Yet, scientific journal identification that we have, no clear information whether it is scientific journal well-played quality or not. In addition, no research activities to evaluate overall journal that has publish in Indonesia, at least, to decide core journal in each field of science.

As regards age of the most frequently document cited showing us on how often the scientists searching and reading current scientific information from any sources. The data age of the most frequently document cited also giving us information how fast accelerate progress of a science. The more youngest of the document age of the most frequently cited in certain field of science, the more fast accelerate progress of that field of science. But, it is allowed by the assumption that a scientist have a well-acces to the current scientific information that has publish current progress in such field of science. If do not have a well-acces, current progress of science could not searching and reading

and this scientist still citing old scientific information without consider that there are new information in its field. On the contrary, old literature might be a valid information. Old literature might be shown that the information was a high quality eventhough its age was old. In such field might be nothing a new theory to criticize or arguing the old theory. Therefore, we may concluded that the above data is moderate since most (47.2 percent) of the literature age is within 0 to 5 year group. Pasquariela's (1981) findings also shows the same result with this one.

5. Indonesia in other Southeast Asian Countries

Due to the phenomena of scientific communication of population scientists, the question is where is the position of Indonesia in other Southeast Asian region? There are two kinds of data can be used in this paper to answer that question. *Firstly*, the data from *Asia Pacific Population Journal* (APPJ), the quarterly that has been published by the Population and Rural and Urban Development Division of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) with support from ESCAP and the United Nations Population Fund (UNFPA). The data uses are from five years APPJ publication (1996-2000). Since the scope of APPJ are Asia and the Pacific region, however for this paper, only author and subjects from Southeast Asian countries will be analyse. With this way, we can see the position of Indonesia in other Southeast Asian region, particularly in the matter of its author and subjects during the period.

Table 7 presented that during the period of five years, only one author from Indonesia as a single author published article in APPJ as well as Singapore, Thailand, Philippines, Myanmar, and Laos. In other hand, six single authors of Vietnamese published their article in APPJ at the same period. From the point of a number of countries total population with assume that it is following by the total of scientist, this position seems not a good position. It is very contradictive with the position of Vietnam with from both total author and subject giving a good contribution to the APPJ, even taken a first top rank of Southeast Asia region in this period.

Yet, there are two authors from Indonesia was collaborated with abroad scientist. It is hope that there are gain brain of knowledge transfer from abroad scientist to the Indonesian. However, there are nine subject of Indonesia appear and analysed in the same period. It means that a large parts of Indonesian subject covered in APPJ at that period writing and published by population scientist from outside Indonesia. Author from Indonesia was contribute only 8,3 percent for single and 9,7 percent for total author at that period. In this period of APPJ edition, Vietnam contributed 50 percent for single and 41,9 percent for total author of the period. Therefore, we may be able to be concluding that for this period of APPJ edition is "Vietnamese".

The less contribution of Indonesian population scientists compared with other Southeast Asian countries to share their research findings to the scientific journal might be related to the strong clout of oral culture instead of writing cultured in Indonesia. Currently, all of the scientific communication in Indonesia lead by oral cultured which showing in seminars, discussion, and meetings. There was no good formal documentation of these activities. As regards writing cultured, the strong influence of the lowest reading

cultured that has overwhelmed large parts of scholars in Indonesia may be related. Most of Indonesian scholars tend to share their thought orally without try to document it by writing to widespread sharing to any other scholars. As the result, listening habits more dominant instead of reading habits. These phenomena explained us why scientific book education industry in Indonesia was stagnant if we compared with other Southeast Asian countries, evenly western. Hence, an effort to strong encourage read-writing habits on Indonesian scholars should be, without ignore of listen-oral habits.

Secondly, Indonesian position between Southeast Asian countries also find from the indicator of share of the mainstream journal articles. Table 8 presented that during the period of 1990-2002, percentages of Indonesian scientist contribution to the development of the world science and technology only 0,033 percent. This rate was below of other Southeast Asian countries such as Thailand: 0,087 percent and Malaysia: 0,065 percent, or Singapore that highest contribution in Southeast Asia region with rate is 0,230 percent. While Sumarwoto (1995) find that point citation index from SCI for Indonesia was only 2,5. Compare it, for example, with point citation index of Egypt and India, 17 and 90 respectively.

Citation point index reflect the contribution of Indonesian scientist between scientist from other countries which done by citing Indonesian scientist. The more often of scientific article written by Indonesia scientist cited by other scientist, the more high of citation point index. Indonesian contribution rates above reflect that scientific work of Indonesian scientist rare either to publish in international journal and the quality is low if it is publishing in international journal that has listed by SCI. This indicator shows that how productivity and the quality of Indonesian scientist in scientific communication through journal. Frankly, it should be recognize that the productivity and the quality of Indonesia scientists “not so good”, evenly in international level.

6. What DT Can Do to Enhance Scientific Communication

I have strong conviction that the DT could play a key role to enhancing the progress of scientific communication in Indonesia. DT in this paper is referring to the postgraduate program for population studies or various training program for population scientist at research institution. DT, however, is “mother” that thereof population scientist delivers. Its mean that DT is determinant factor should be considering and become a centre of concentration to develop scientific communication. In case of previous data indicating that scientific communication in Indonesia is inadequate, it means that the output of DT in the context of enhancing scientific communication also in adequate. Hence, the role of DT to enhance scientific communication should make an appropriate reposition with encourage the outputs to take an active participation. Student of DT not only master in demography or population studies but also having a capacity to apply and communicated his skill to other scientists. Should be notion that the DT previously tends to only stressing on mastering of science and not consider to the mastering scientific communication. They are no new programs created to making vivid scientific communication on population field.

DT can do beneath role to enhance scientific communication. These included:

1. As regards author productivity, the DT should give strengthen motivation to the student in writing scientific article and fostering them too more productive. As a supervisor, of course, the lecturer like or dislike should do a good performance, act as a pioneer in writing excellent scientific article, and publish it in qualified journal. It needs work hard, not easy to do upon the epidemic culture of oral presentation but it should be pioneering and wakes up the sleep talent. For this time an effort like this was very difficult to make initiatives since the elements of the scientific communication set-up on rambling vicious circle in Indonesia. In facts, both lecturer and student unproductive to write scientific article. Hence, DT needs a revolutionary on basic program involving all elements of DT organizer. It should be pioneering for a vision to wake up the formal scientific communication and can be compete with other scientist in all over the world and behind from other countries. Funding aid from donor agency and support from the government also needed. The activities of read-research-write should be new cultures in all scholars in DT organize. These activities, of course, should start from basic education. The motto: publish or perish should be a new spirit and motivation to all level of education: basic, middle, and high. It should be aware that writing activities is not a basic talent but a skilled that comes up from habits. The habits come from continuous practice in writing. The more often we active in writing, the more mature of habits, and then to be skilled. This practice-habits-skilled should be implement in the DT program for both lecturer and student. DT student not only skilled in statistical work and sophisticated demographic technique but also an endeavour and try to share their statistical work through scientific article to scientific communities of population studies. If this resolution should do, it is possible that DT could enhance scientific communication in Indonesia.
2. As regards author collaboration, the DT should encourage and fostering the benefit mutual scientific collaboration to all scholars around DT. The types of collaboration could be are: lecturer-student, lecturer-lecturer, student-student, supervisor-assistant, researcher-consultant, DT-DT and local DT-international DT collaboration. At least, the three-first types (lecturer-student, lecturer-lecturer, student-student) should be target initiatives. There are two benefit of author collaboration. First, scientific article could be more quality since in collaboration accommodate more than one though or ideas. Therefore, valid argumentation and analysis of the article is more argument able and deepest. Second, transfer of knowledge should appear between involving authors. These knowledge transfers could be clear seen in case of collaboration between lecturer senior-juniors or between lecturer and the student. The DT should be encouraged of this collaboration and thereby the traffics of the scientific communications are increased.
3. The role of DT in author productivity and author most frequently cited are much closed. However, in order author most frequently cited by others, he/she must be productive. Yet, in author most frequently cited the role of DT more stressing on how the best way to educate DT student and thereafter produce excellent scientific article. It hopes that an excellent scientific article be a most frequently cited, even

though no one can say definitely about that. DT output also encouraged publishing their scientific article in core journal of demography which circulation widespread all over the world. DT outputs spirited to study and write a subject that has been popular and mainstream in demography as well as explore it till to the roots of the problems or theory and then, formulate a new theory in demography.

4. As regards journal most frequently cited, DT needs to encourage and fostering student to read and study a current trends of population studies that has been publish in core journal of demography and population studies. Core journal in demography is an international journal listed by Institute of Scientific Information (ISI) that most frequently cited by all population scientists all over the world. Core journal often publish subject mainstreams in demography and be a trendsetters. Currently, ISI issued 17 journal most frequently cited in demography subject category. The 17 journals included are: Demography, European Journal of Migration and Law, European Journal of Population, Family Planning Perspectives, International Family Planning Perspectives, International Migration, International Migration Review, Journal of Biosocial Science, Journal of Population Economics, Population, Population and Development Review, Population and Environment, Population Bulletin, Population Research and Policy Review, Population Studies-A Journal of Demography, Social Biology, and Studies in Family Planning (ISI 2002).
5. As regards age of the most frequently document cited, DT should encourage the student to always searching current scientific information in any ways and forms. Internationally, easy of access and use of current information are paramount. Many scholars turn to Amazon.com for bibliographic help. The database is not as complete or scholarly as that of a major library, but it is more convenient to use. In general, the volume of material on the Web is growing, and scholars, like the commercial content producers, are engaged in a “war for the eyeballs.” However, it does lead too much more efficient use of time, eliminating all the drudgery of trips to the library (Odlyzko 2002). Easy access from one’s desktop (or increasingly from one’s mobile device) is leading to usage of serious scholarly material by a much wider audience, of both other scholars and the general population. That trend is consistent with the general push for more interdisciplinary work, and for more focused work. Easy electronic access to scientific information is also changing the patterns of use. Much of what we have been used to was the artefact of print technology. We have eliminates the limitations of technology and changes the behaviour. With lower costs of access, a greater fraction of reading is of the superficial browsing variety. Internet is facilitating the current evolution in scientific communication. Internet is unavoidable and overwhelmingly desirable. It will produce a much more efficient system that will serve the scholarly community and the general population far better than the present one, which is based on Gutenberg’s invention. DT organizer can hasten the ongoing evolution by steps such as those advocated in which would require scholars to make preprints of their papers freely available on the Web.

In anticipation of the silent of the formal scientific communication of population scientist and the least of scientific journal in Indonesia, it needs a new commitment and initiatives to create the policy easy access of scientific information. This policy hopes

to be one of push factor to appearing of Indonesian's article in various core journals, particularly in demography subject category. Funding aid from national and international donor agency should be helps this policy. Gaillard studies in twelve nations of developing word (Algeria, Egypt, Kenya, Nigeria, Senegal, South Africa, China, India, Thailand, Argentina, Brazil, and Venezuela) that represent most of the leading producers of science in the developing world find the similar problem. Gaillard suggests that financial support for science, the social and political status of science and scientists, and the institutional infrastructure of science in that particular nation should be encouraged (Gaillard 1997).

Beside that, various organizations in demography needs to create new commitment to develop read-research-write culture to its member as well as provide best scientific communications medium through scientific journal. The JOP and POP need to do revitalization to become qualified scientific journal in demography and population studies in Indonesia. New scientific population journal also need to foster their quality and the publish continuity. With this way plus creating of scientific environment culture based competition, excellent scientific article publish in qualified scientific journal would be established in Indonesia. It means that the era of formal scientific communication will be come ups in Indonesia.

I want to close this paper to quote parts of the article number 33 of the Declaration on Science and the Use of Scientific Knowledge adopted by World Conference on Science:

... It is more than ever necessary to develop and expand science literacy in all cultures and all sectors of society as well as reasoning ability and skills and an appreciation of ethical values, so as to improve public participation in decision-making related to the application of new knowledge. Progress in science makes the role of universities particularly important in the promotion and modernization of science teaching and its coordination at all levels of education. In all countries, and in particular the developing countries, there is a need to strengthen scientific research in higher education, including postgraduate programmes, taking into account national priorities.

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Table 1. Number of document cites from three sources

Journal Title	Number of articles	Number of documents cited	Average Cites per article
MDI	35	587	16,7
POP.	106	1.598	15
JOP	31	643	20,7
<i>Total</i>	172	2.828	16,4

Table 2. Author publish more than two article

No.	Rank	Author's name	Freq.
1	1.5	Sukamdi	8
2	1.5	Faturochman	8
3	3	Masri Singarimbun	7
4	4	Muhadjir Darwin	6
5	6	Tukiran	5
6	6	Elfindri	5
7	6	Agus Dwiyanto	5
8	10	Tadjuddin Noer Effendi	4
9	10	Omas Bulan Rajagukguk	4
10	10	N.Haidy A.Pasay	4
11	10	Marcelinus Molo	4
12	10	Ida Bagoes Mantra	4
13	17.5	Terence H. Hull	3
14	17.5	Susi Eja Yuarsi	3
15	17.5	Sri Moertiningsih Adioetomo	3
16	17.5	Sofian Effendi	3
17	17.5	Siswanto Agus Wilopo	3
18	17.5	Prijono Tjptoherijanto	3
19	17.5	Ken Suratiyah	3
20	17.5	I Gusti Ngurah Agung	3
21	17.5	Elisabeth Frankenberg	3
22	17.5	Aris Ananta	3

Table 3. Level of author collaboration from three source

No.	Level	Number of Author	%
1.	1	128	54
2.	2	56	23.6
3.	3	36	15.2
4.	4	12	5.1
5.	5	5	2.1
5.	Total	237	100

Tabel 4. Authors cited more than ninth from three sources

No.	Rank	Author's name	Freq.
1	1	Masri Singarimbun	32
2	2	Terence H. Hull	23
3	3	Aris Ananta	22
4	4	Graeme Hugo	21
5	5.5	Chris Manning	19
6	5.5	Benjamin White	19
7	7	Gavin Jones	18
8	8	Sajogjo	17
9	9	Tadjuddin Noer Effendi	14
10	10	Haidy N. Pasay	13
11	13.5	Sri Moertiningsih Adi Oetomo	11
12	13.5	Sofian Effendi	11
13	13.5	Evers-Hans Dieter	11
14	13.5	Ida Bagoes Mantra	11
15	13.5	Mubyarto	11
16	13.5	Haryono Suyono	11
17	18	Geertz Clifford	10
18	18	Frans Husken	10
19	18	Ken Suratiyah	10

Table 5. The rank of journal cited more than fifth from three sources

No.	Rank	Journal Titles	Freq.
1	1	Population and Development Review	42
2	2	Prisma	40
3	3	Bulletin of Indonesian Economics Studies	32
4	4	Demography	25
5	5	Population Studies	22
6	6.5	Populasi	17
7	6.5	Studies in Family Planning	17
8	8	Majalah Demografi Indonesia	15
9	9.5	Journal of Marriage and the Family	13
10	9.5	World Development	13
11	11	Economics Development and Cultural Changes	12
12	12	Warta Demografi	10
13	13	Population Bulletin	8
14	14	Family Planning Perspectives	7
15	14	International Labor Review	7
16	14	Social Science Medicine	7
17	18.5	Asia Pacific Population Journal	6
18	18.5	Journal of Development Economics	6
19	18.5	Research Ageing	6
20	18.5	The American Economics Review	6

Table 6. Literature age from three source

No	Age group	Total citation	%
1	00-05	1319	47.2
2	06-10	702	25.1
3	11-15	371	13.3
4	16-20	190	6.8
5	21-25	89	3.2
6	26-30	42	1.5
7	>30	83	2.9
	Total	2796	100

Table 7. Number of authors and subject of article in APPJ during 1996-2000

No	Southeast Asia Nation	Number of			Subject
		Author(s)			
		Single	Collaboration	Total	
1	Singapore	1		1	10
2	Thailand	1	3	4	11
3	Malaysia		3	3	6
4	Philippines	1	1	2	9
5	Indonesia	1	2	3	9
6	Myanmar	1	1	2	8
7	Cambodia		2	2	5
8	Laos	1		1	6
9	Vietnam	6	7	13	14
10	Brunei Darussalam	-	-	-	2
	Total	12	19	31	83

Table 8. Share of Southeast Asia's mainstream journal articles 1990-2002

NO	Southeast Asia Nation	Journal article	%*
1	Singapore	30275	0,2307
2	Thailand	11496	0,0876
3	Malaysia	8574	0,0653
4	Indonesia	4360	0,0332
5	Philippines	4316	0,0328
6	Vietnam	2888	0,0220
7	Myanmar	321	0,0024
8	Brunei Darussalam	230	0,0017
9	Cambodia	129	0,0009
10	Laos	82	0,0006

* Percent of Total for All Nations (13.123.250)

Source: 2002 Science Citation Index <http://www.isinet.com>