The Best of Both Worlds: Indonesian Diaspora's Attempt to Take Knowledge Home

Novalia Pishesha and Rezy Pradipta

20 August 2015

Early version of this article was submitted as an entry to the essay competition at the Indonesian Scholars International Convention (ISIC) 2015

A nation's capacity to conduct proper scientific research and engage in innovative technological development is paramount in determining its ability to protect its vital interests while growing in an increasingly competitive global market. Historically, Indonesia has been hindered in this regard by a research capacity that lagged behind in comparison to some of its neighbors like Japan, South Korea, Australia, China, Singapore, and Malaysia. Arguably, it has led many of Indonesia's best and brightest to take their talents abroad in search of better opportunities. While this "brain drain" is a widely recognized dilemma, we believe that the extensive amount of knowledge, technical expertise, and resources accessible to these Indonesian students and researchers represent a tremendous untapped potential. Along this line of reasoning, we outline several possible approaches that can leverage these students and researchers to strengthen Indonesia's research capacity.

Here we propose several initiatives to achieve a significant transfer of technical knowledge into Indonesia, which can be expected to solidify many of the basic foundations essential for carrying out successful domestic research and development. Specifically, we seek to engage Indonesian students and researchers abroad through: (1) the creation of specially arranged visiting researcher immersion programs at various foreign academic/research institutions, (2) a coordinated translation of up-to-date science and engineering textbooks and other technical resources into the Indonesian language, (3) the establishment of an organized repository of selected lecture notes and examination problems from leading universities to illustrate the basic training necessary for cultivating adequate research aptitude, and (4) a broad call for Indonesian researchers abroad to incorporate various aspects of Indonesia (e.g. geographic locations, geological conditions, biodiversity, socio-political structures, historical trajectories, etc) as potential new frontiers in their respective research interests. All of these initiatives, of course, will need the full cooperation of various elements in Indonesia (e.g. government agencies, research institutions, universities, and mass media) if they are to succeed.

In the first approach, the general idea is to invite students, academics, and professionals from around Indonesia to embark on specially arranged visiting researcher programs at leading foreign universities and research institutions. In our view, such visiting research programs should be 6-9 months in duration. Those who participate will be expected to work full-time on a set of research tasks inside the laboratories, under the close supervision of resident professors or senior research scientists. Unlike short networking/leadership conferences that focus on developing soft skills, the visiting scholars' work will immerse them in the technical aspects of research and scientific inquiry, endowing them with the expertise necessary to pursue work of similarly high caliber upon returning home.

To spearhead the effort, Indonesian students and researchers abroad can be mobilized to advocate for the creation of such visiting research student/scholar positions at their respective institutions. As an initial starting point, they can recommend several names of potential candidates from Indonesia to fill the anticipated visiting student/scholar positions. Of course, each host institution will retain full discretion to determine the most suitable candidate(s). Moreover, existing Indonesian students and researchers at these foreign institutions can potentially play the role of mentor or research supervisor as well.

It should be noted that the aforementioned visiting research program is a non-degree program (i.e. the host institutions would not actually confer any academic accreditation to the participants). Even without any conferred academic degrees, we strongly believe that the offered learning opportunities would still be highly attractive and greatly beneficial to many in Indonesia. It serves to establish valuable credentials for the participants (in addition to the obvious educational value and transfer of technical knowledge), which they can use to further advance their academic and professional development. For example, a student working on senior thesis (= *skripsi*) might, under this kind of arrangement, be afforded the opportunity to pursue it at a world leading university abroad. While the earned bachelor degree will still come from the home university in Indonesia, the accomplished senior thesis is likely to be of a much higher quality, tapping into the extensive resources of the host institution. This opportunity would undoubtedly be beneficial for the student's future career advancement, in addition to providing strong connections with the host research institution.

To our advantage, the infrastructure for such visiting researcher program need not be created from scratch. Organizations like the German Academic Exchange Service (*Deutscher Akademischer Austausch Dienst*, DAAD) might be used as a model, providing a tried and tested platform from which to start. In the long run, we expect that the entire operation can also be formally coordinated with certain sections of the Indonesian government such as RISTEK or LPDP.

In the second approach, we would like to engage members of the Indonesian science diaspora in a collective effort to translate up-to-date science and engineering textbooks as well as

other technical references into the Indonesian language. Members of the Indonesian science diaspora would be ideal for this initiative because of several reasons. First of all, they are considerably more proficient in technical English than most general-purpose language translators. Thus, the chance of any potential mistranslation would be minimized. In addition, they might have previously used the target textbooks in their own coursework, which would allow them to better understand most of the students' needs and consequently makes the overall translation process more effective.

The goal here is to provide a greater accessibility to fundamental science learning opportunity for students in Indonesia, especially those with limited English proficiency. The price of the translated (Indonesian language) edition could potentially be made much lower than the original (English) edition through cooperation between foreign and domestic publishers and printing houses. The prospect is quite realistic, especially if we can negotiate with the original authors to waive excessive royalties.

This type of concerted effort has been done successfully in the past to translate the textbook *Molecular Cell Biology* into the Vietnamese language. The textbook was originally authored by Prof. Harvey Lodish (MIT) and several other leading experts in the field, and the translation project was initiated by several Vietnamese students and researchers abroad. The translators and Prof. Lodish resolved not to take any royalties to keep costs low, making the translated textbook much more affordable to many Vietnamese students, who benefited from having access to the textbook in their mother language. Currently, a similar effort is underway to translate *Molecular Cell Biology* into the Indonesian language. So far, this book translation project has drawn upon numerous Indonesian students in multiple countries who have been studying various aspects of *Molecular Cell Biology*, and it continues to grow.

It is hoped that the proposed science and engineering textbook translation would be able to mitigate some of the present shortcomings within the university-level education in Indonesia. These issues include the short supply of the most up-to-date and well-illustrated textbooks, as well as the general lack of primary literatures in many of the universities. In lesser-funded universities, the most up-to-date textbooks might even be nonexistent and the students might not be proficient enough to read English-language textbooks. Hence, we expect that a textbook translation initiative would be immensely helpful. If necessary, efforts could be extended to other fields and merged into a centralized, administered initiative, laying the groundwork for constructive exchange of ideas, future collaboration, and improvement in national research capacity.

In the third approach, the transfer of knowledge is slightly less explicit. The idea is to have Indonesian students and researchers abroad compile a set of selected lecture notes, exercises, and examination problems (from several world leading universities) and disseminate these special materials for pedagogical use in Indonesia. It is hoped that many of these exer-

cises and examination problems would be routinely used (e.g. as homework, midterms, and finals) for formal courses/classes (= *mata kuliah*) in Indonesian universities. By seamlessly incorporating these vetted materials into the bulk of Indonesia's higher education curriculum, we may expect a gradual, systematic spread of higher standards and, thus, improvement in performance.

The main objective here is to implant subtle insight into the minds of students in Indonesia to help them develop better research aptitude. In this case, the special materials are intended to discreetly illustrate the kinds of training that one would normally receive in leading foreign research universities. We must specifically highlight the importance of learning from the exercises and examination problems. The reason is straightforward: there are certain aspects of science and engineering that cannot be acquired only by reading textbooks or attending lectures alone. In fact, through extensive problem solving, students would be able to achieve a better and often insightful understanding of the subject matter. Thus, a rich collection of challenging pedagogical exercises/problems would be a highly valuable asset for numerous higher education institutions in Indonesia; and members of the Indonesian science diaspora are ideally situated to pioneer such efforts.

In the fourth and final approach, we would strongly urge Indonesian researchers abroad to expand their respective research frontiers into areas that overlap with Indonesia. Specifically, they are encouraged to utilize certain aspects of Indonesia as key tool and ingredients to achieve viable technological breakthroughs and scientific advancements. In fact, Indonesia's particular geographic location, geological conditions, natural biodiversity, socio-political structures, and historical trajectories, among others, are untapped gold mines of important scientific discoveries and innovations. It is thus sensible to combine these promising untapped resources with the expertise possessed by the Indonesian science diaspora community. By doing so, a wide range of favorable outcomes might materialize. Some examples include: the establishment of a novel genome database for various Indonesian flora and fauna, the establishment of an extensive library of active organic substances for medicinal drug screenings, or a comprehensive geospatial mapping of upper atmospheric conditions over the Indonesian territory. Such successful expansion of several scientific research areas into Indonesia could stimulate high levels of public interest and potentially attract significant amount of foreign investment as well.

While members of the Indonesian science diaspora around the world might be able to contribute with their expertise, they certainly cannot do it alone and will require significant support from various elements at home. [Many kinds of support, although might be seemingly simple, could in fact produce very positive and meaningful effects.] For example, joint appointments between Indonesian universities and foreign research institutions would be very helpful in fostering collaboration and transfer of knowledge. With a joint appointment,

it would be significantly easier for members of the Indonesian science diaspora to operate and conduct their research activities (e.g. collecting data or setting up local programs) in Indonesia. Furthermore, joint appointment at Indonesian universities would enable a more effective collaboration with other professors there. At the same time, it would also be easier for members of the Indonesian science diaspora to train Indonesian students as competent researchers and innovators. Thus, both sides actually benefit much from the joint appointment, strengthening Indonesia's position as an innovative force on the world stage.

To further illustrate the desired ideal goal, let us consider the following final (hypothetical) example. Suppose that there is an Indonesian researcher X who works at a leading university M abroad, with a scientific expertise on red blood cell biology. X is interested in studying a set of specific genes important in red blood cell development that confer advantageous genetic adaptation, which enables people who live in highlands near *Puncak Jaya* to tolerate hypoxic environment. In this idealized scenario, X has a joint appointment at a university G in Indonesia. With a formal joint appointment at an Indonesian institution, it is generally much easier for X to conduct scientific research in the Indonesian domain: X can have the full permit to collect and transport biological samples from fieldwork. Obviously, these privileges suit X's research interest in Indonesian genetic diversity very well. The necessary samples are collected, sorted, and then analyzed in X's research laboratory at university M, which has all the required equipment to perform the analysis. To be prudent, certainly university G should also keep a set of the same samples, even though they might not have the full capability to analyze the samples yet. After the data analysis is complete, X and collaborators (from both universities) should then report their results together in the relevant peer-reviewed journal. Finally, the published journal article can even be incorporated into the curriculum (e.g. as recommended reading for students) at university G. It will make the transfer of technical knowledge much more comprehensive, and potentially stimulate some further scientific research within the country as well.

Hence, we argue that the abundance of Indonesian students and researchers abroad need not necessarily be viewed as a harmful brain-drain that only impairs the country. Rather, through a set of clever engagement, they can help establish a well-oiled pipeline to facilitate and maximize the flow/ingress of technical knowledge that would ultimately be beneficial to the advancement of the nation's research capacity.