Higher Education Provider/College Excellence Mapping Base on Scientific Publication

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Abstract. Higher education is one of the most important educational stages in a country. Most experts in various fields become proficient through higher education. Therefore, higher education provider or college should improve their education quality continuously. One of ways to improve their quality is by college excellence mapping. This mapping is held with aim to see the excellence of each providers in Indonesia. As a center of education, as well as research center, one that can be used as a mapping base is scientific publication. In this study, the excellence that is want to be seen refers to RPJPN 2005-2025 and RPJMN 2015-2019. Those are food; energy; technology and transportation management; information and communication technology, defense and security technologies; health and medicine technology; and advanced material. This mapping is done by The Ministry of Research, Technology, and Higher Education (KEMENRISTEKDIKTI) Republic of Indonesia. Hopefully, through this mapping, colleges will be encouraged to improve their education quality continuously.

1. Introduction

According to Law Number 12 Year 2012 on Higher Education, education means: “Education is a conscious and well-planned effort to create an atmosphere of learning and learning process so learners actively develop their potential to have spiritual power, self-control, personality, intelligence, noble character, as well as skill that are needed by himself, society, nation, and state.” [1]

While higher education means: “Post-secondary education level that includes diploma programs, undergraduate programs, master programs, doctoral programs, and professional programs, as well as specialist programs, that are organized by higher education providers based on Indonesian culture.”

Furthermore, higher education provider or college means: “Unit of education that provides and organizes higher education. Those providers are divided into public and private providers. State provider is provider that is established and/or organized by the government. And private provider is provider that is established and/or organized by the community.”

According to the same law, higher education functions to: “1. develop the ability and form the character and civilization of the nation that is useful in order to education the nation; 2. develop innovative, responsive, creative, skillful, competitive, and cooperative academic community through...
the implementation of Tridharma; and 3. develop science and technology by taking and applying the humanities value.”

While higher education provider goals are: “1. the development of students potential to become human beings who believe and cautious to God Almighty and have a noble character, healthy, knowledgeable, capable, creative, independent, skilled, competent, and cultured for the benefit on the nation; 2. produce graduates who master the branch of science and/or technology to meet the nation interests and increase the nation competitiveness; 3. science and technology production through research that pay attention and apply humanities value to benefit the nation progress, as well as civilization progress and mankind welfare; and 4. the realization of community service based on reasoning and research work that is useful in advance the general welfare and educate the nation life.”

There are some types of college in Indonesia, those are academy, polytechnic, high school (sekolah tinggi), institute, and university. [2] Based on high school database, colleges in Indonesia are numbered 4,549 which consists of 1,097 academies, 256 polytechnics, 2,454 high schools, 179 institutes, and 563 universities. All of those colleges try to promote and show their excellence continuously. For examples, University A promote their excellence in economics, University B in laws, University C in medical studies, etc. Those excellence often was measured by the university itself and not by a right assessment. Whereas, they can use scientific publication as a base of the assessment. Some of those scientific publications are reputable international journal, international journal, and accredited journal. Those products refer to 7 focus areas of science and technology as noted at [3]. National Long-Term Development Plan or Rencana Pembangunan Jangka Panjang Nasional (RPJPN) 2005-2025 and [4] National Mid-Term Development Plan or Rencana Pembangunan Jangka Menengah Nasional (RPJMN) 2015-2019, those are: 1. food; 2. energy; 3. technology and transportation management; 4. information and communication technology; 5. defense and security technology; 6. health and medicine technology; 7. advanced material, and 8. etc (mathematics and natural sciences, plant science, animal science, linguistics, economics, and education science).

Based on the above background, it would be necessary to do colleges mapping in Indonesia based on scientific publication. So, government can know the excellence of each provider and develop each provider can be directed. The purpose of this research is gain a colleges map that is based on scientific publication of each providers.

2. Experimental Details

Data which are used for this colleges excellence mapping are scientific publication data of each providers. Those data filled by each providers in Sistem Informasi Manajemen Penelitian dan Pengabdian Kepada Masyarakat (Simlitabmas) or Research and Community Service Management Information System in English. Those data are scientific publication data from 2015. Those data are uploaded to www.simlitabmas.dikti.go.id. But, those data must be verified first so we get valid data. Those verification are:

a. Does those data administration complete? For example, are those data ready to used? If not, those data must be deleted (not analyzed).

b. Is those data written/listed twice or more than once? If yes, then the second or later data must be deleted (not analyzed).

c. Is the affiliation, proposer, author or creator of those scientific publication true? If not, those data must be deleted (not analyzed).

d. Is those data really resulted in 2015? If not, those data must be deleted (not analyzed).

3. Results and Discussion

The result of data verification is below.
Table 1. Scientific Publication Data Since 2015 and The Verification Result

| Scientific Publication | Number of Providers Before | Number of Providers After | Number of Data Before | Number of Data After |
|-------------------------|----------------------------|---------------------------|-----------------------|----------------------|
| 1. Reputable International Journal | 81                         | 79                        | 4.556                 | 4.527                |
| 2. International Journal | 214                       | 202                       | 5.661                 | 5.583                |
| 3. Accredited National Journal | 102                       | 97                        | 785                   | 752                  |

Number of scientific publication data above were checked one by one and matched into one of 7 focus areas of science and technology as noted in RPJPN 2005-2025 and RPJMN 2015-2019. Those areas are food, energy, technology and transportation management, information and communication technology, defense and security technology, health and medicine technology, and advanced material. The result of verification is shown at Table 2.

Table 2. Verification of Scientific Publication of Each Focus Areas in 2015 Result

| Num | Detailed Focus                              | Scopus | International Accredited |
|-----|--------------------------------------------|--------|--------------------------|
| 1   | Poverty Alleviation                        | 7      | 12                       | 2                        |
| 2   | Climate Change and Biodiversity            | 286    | 199                      | 19                       |
| 3   | New and Renewable Energy                   | 126    | 157                      | 2                        |
| 4   | Food Security                              | 108    | 156                      | 37                       |
| 5   | Health, Tropical Disease, Nutrition and Drugs | 876  | 1.212                    | 151                      |
| 6   | Disaster Management and Mitigation         | 59     | 43                       | 3                        |
| 7   | National Integration and Social Harmony    | 110    | 401                      | 99                       |
| 8   | Regional Autonomy and Decentralization     | 5      | 28                       | 14                       |
| 9   | Art and Culture/Creative Industry          | 16     | 52                       | 39                       |
| 10  | Infrastructure                             | 53     | 106                      | 11                       |
| 11  | Transportation                             | 25     | 47                       | 3                        |
| 12  | Defense and Security                       | 0      | 0                        | 0                        |
| 13  | Information and Communication              | 788    | 611                      | 14                       |
| 14  | Technology                                 | 166    | 540                      | 33                       |
| 15  | Advanced Material                          | 8      | 38                       | 0                        |
| 16  | Maritime                                   | 296    | 220                      | 91                       |
| 17  | Mathematics and Natural Science            | 700    | 485                      | 41                       |
| 18  | Plant Science                              | 120    | 181                      | 25                       |
| 19  | Animal Science                             | 102    | 134                      | 55                       |
| 20  | Engineering Science                        | 509    | 386                      | 16                       |
| 21  | Linguistics                                | 14     | 33                       | 6                        |
| 22  | Economics                                  | 126    | 385                      | 55                       |
| 23  | Education Science                          | 27     | 157                      | 36                       |

Data above can be used to know excellence focus for each scientific publication. For each scientific publication is shown at Table 3 below.
Table 3. Excellence Focus for Each Scientific Publication

| Num | Excellence for Reputable International Journal (Scopus)          | Publication Number |
|-----|---------------------------------------------------------------|--------------------|
| 1   | Health, Tropical Disease, Nutrition and Drugs                | 876                |
| 2   | Information and Communication Technology                     | 788                |
| 3   | Mathematics and Natural Science                              | 700                |
|     | **Excellence for International Journal**                      |                    |
| 1   | Health, Tropical Disease, Nutrition and Drugs                | 1,212              |
| 2   | Information and Communication Technology                     | 611                |
| 3   | Advanced Material                                            | 540                |
|     | **Excellence for Accredited National Journal**               |                    |
| 1   | Health, Tropical Disease, Nutrition and Drugs                | 151                |
| 2   | National Integration and Social Harmony                       | 99                 |
| 3   | Human Development and Nation Competitiveness                 | 91                 |

Table 2 and 3 are shown that scientific publication in form of reputable international journal, international journal, and accredited national journal that are resulted by colleges with Health, Tropical Disease, Nutrition and Drugs focus excellence is first rank. Then, Information and Communication Technology focus excellence is second rank (for reputable journal international and international journal). Then, National Integration and Social Harmony focus excellence is second rank for accredited national journal.

Third rank are Mathematics and Natural Science focus excellence for reputable international journal, Advanced Material focus excellence for international journal, and Human Development and Nation Competitiveness focus excellence for accredited national journal.

Table 2 is also shown that excellence that occupy last rank for all three journals are Defense and Security focus excellence. This is caused by that excellence focus is confidential, so research results can not always be published.

From research result above, government of Indonesia can know the excellence of colleges in Indonesia. That excellence is scientific publication in twenties focus areas. Later, government can adjust their future policies with that excellence. For example, focus area that still have a few scientific publication whereas Indonesian society really need the research results, government can boost providers to be more active to do researches and publish the research results. Later, those results can be used as one of contributor aspects in policy decisions. Furthermore, focus area that have had a lot of scientific publications, those publications can be used by Indonesian government as one of references in developing and determining the direction of policies.

4. Conclusion

Validated scientific publication that are resulted by colleges in 2015 has not referred to 7 focus areas of science and technology development. This is shown by the number of study outside those 7 focus areas is still lot. Health, Tropical Disease, Nutrition and Drugs excellence focus is first rank for reputable international journal as many as 876 publication, international journal as many as 1,212 publication, and accredited national journal as many as 151 publication. Defense and Security excellence focus is last rank for every journal because there is no publication in that focus.

From the research result, government of Indonesia can know excellence of colleges in Indonesia. That excellence is scientific publication in twenties focus areas. Later, government can adjust their future policies with that excellence.
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