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Diagnostic Study

Addressing Barriers to University Research: A Case Study of University of Indonesia

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April 2017

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UI·CSGAR
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Foreword

We are first and foremost grateful for the grace and guidance of God Almighty that has allowed us to complete this collaborative research of, Diagnostic Study: Addressing Barriers to University Research.

This study is significant as it provides comprehensive insight on research governance in universities–a resource that is greatly needed in order to understand this topic. For researchers, contextual knowledge pertaining to research governance issues, in particular in University of Indonesia, is vital. The study highlights the current context of research governance and scientific publication, impacts of the two activities on university ranking and quality, and barriers to research. Moreover, the study looks at two major challenges that Indonesian universities need to address.

The two overarching challenges that Indonesian universities face today concern research and development, two of the three pillars of a university's triple roles, or the Tri Dharma. The first challenge is about competition and research collaboration to produce scientific publications; the second is the benefits and value of those research products and publications. For universities, Tri Dharma must be exercised while taking current national developments into account. All works produced by Indonesian academia must contribute to the advancement of life, governance and bureaucracy reform, and to the development of our national identity. University research must be of practical use for the Government in its policy-making process in pursuit of realising evidence-based policy. Indonesian universities and the Government must work together to address a number of crucial issues, such as consistency between university research agendas and government policy priorities; the limited number of lecturers/researchers; teaching workloads that engulf research schedules; research funding optimisation; and research collaboration between universities and government and between universities both national and international. Synchronising strategic policy on scientific

development and research at university and government levels, and support from the Government and the private sector to universities are critical to improving research quantity and quality, as well as its value to national development.

I wish to extend my appreciation to the team of authors and the Knowledge Sector Initiative for initiating and completing this study. This serves as an important reminder for universities, the Government, and Development Partner Institutes that university research plays a central role in improving policy quality and governance. I hope this research can provide momentum for Indonesian universities, especially University of Indonesia, to answer the substantial challenges around the Tri Dharma, in particular issues relating to research and community service.

Prof. Dr. Eko Prasojo, Mag.rer.publ
UI-CSGAR Executive Director
University of Indonesia

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Abbreviations and Acronyms

BHMN	:	Badan Hukum Milik Negara (State-owned Legal Entity)
Dikti	:	Pendidikan Tinggi (Higher Education - refer to Kemenristekdikti)
DRPM	:	Direktorat Riset dan Pengabdian Masyarakat (Directorate of Research and Community Service)
FIB	:	Fakultas Ilmu Budaya (Faculty of Humanities)
FISIP	:	Fakultas Ilmu Sosial dan Ilmu Politik (Faculty of Social and Political Sciences)
FT	:	Fakultas Teknik (Faculty of Engineering)
GDP	:	Gross Domestic Product
HKI	:	Hak Kekayaan Intelektual (Intellectual Property Rights)
Kemenristekdikti	:	Kementerian Riset, Teknologi, dan Pendidikan Tinggi (Ministry of Research, Technology and Higher Education)
KSI	:	Knowledge Sector Initiative
MWA	:	Majelis Wali Amanat (Board of Trustees)
NIDK	:	Nomor Induk Dosen Khusus (Lecturer's Special ID)
PTN-BH	:	Perguruan Tinggi Negeri Badan Hukum (State University as Legal Entity)
RCCC	:	Research Centre for Climate Change
RPJP	:	Rencana Pembangunan Jangka Panjang (Long-Term Development Plan)
SIDR	:	Sistem Informasi Data Riset (Research Data Information System)
UI	:	Universitas Indonesia (University of Indonesia)

1 Introduction

1.1. Background

As an emerging middle-income country, Indonesia is challenged with improving its competitiveness. Development policies should be directed towards exploring potentials that can lead to quality development. One approach to achieve this is by increasing the role of research in the policy formulation and implementation process. Research can be a strategic tool for influencing good policy-making processes. The term 'knowledge-based policy' rests on the idea that research (which produces data) is the basis of good policy.

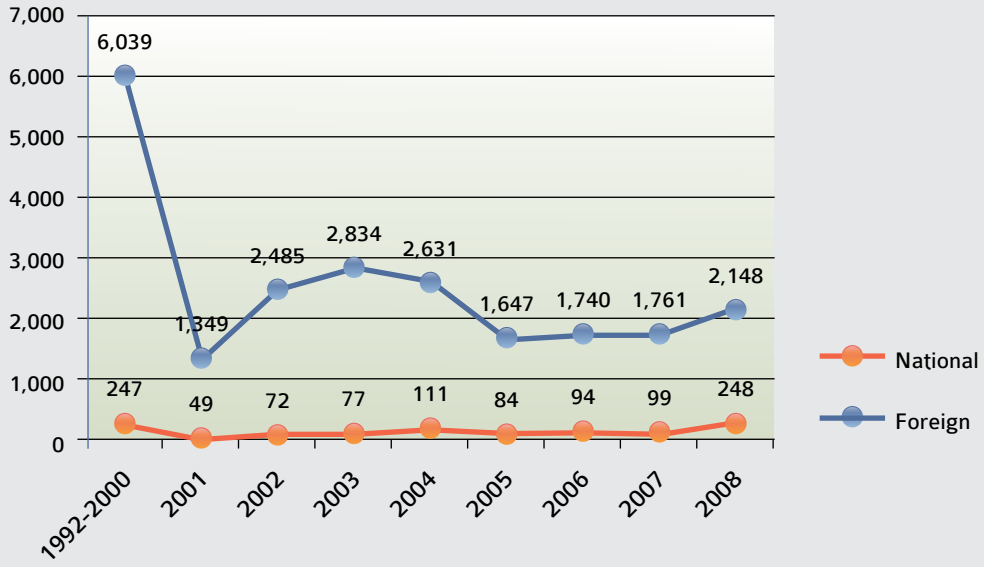
The challenge to build a research capacity that can support the policy formulation and implementation process is faced by all countries, including Indonesia. One of the strategies to address this challenge is to improve the quality of research of Indonesian universities. Despite all efforts to encourage, improve and facilitate research in universities in Indonesia, the quantity and quality of research are still low, as evidenced by two indicators of research performance measurement: the number of international scientific publications and the number of patents. According to SCImago Journal & Country Rank, in the period 1996-2014, Indonesia produced 32,355 scientific publications. This number is below India (998,544 documents), Iran (287,010 documents), Pakistan (81,612 documents) and Nigeria (53,298 documents), and far below other Southeast Asian countries such as Singapore (192,942 documents), Malaysia (153,378 documents) and Thailand (109,832 documents). In addition, the Social Sciences Citation Index reveals that the proportion of research publications submitted to international peer-reviewed journals by Indonesian researchers is only 12 percent. This is only half as many publications submitted to international peer-reviewed journals by researchers from Thailand and Malaysia (Suryadarma et al. 2011).

Indonesian researchers registered fewer patents with the United States Patent and Trademark Office in 2008 than researchers from Singapore, Malaysia, Thailand and the Philippines. Foreign patents dominated registered patents in Indonesia between 1992 and 2008 (Chart 1). This illustrates the low quality of human resources, research and development in Indonesia. The low number of Indonesian researchers' patents registered in Indonesia indicates two things. First, the quality of research has not had significant impacts on the development of science and technology or been highly useful. Second, the Government, universities and research institutions have not systematically encouraged and facilitated researchers to generate innovative research. Nevertheless, the World Intellectual Property Organization reported that patent expenditure in Indonesia reached 10.56 patents per US$ 1 million (approximately US$ 94,700 per patent). That is twice the amount of patent expenditure of South Korea and other countries. The data shows that Indonesian researchers have relatively high potential to produce quality research that deserves a patent for their scientific work. Furthermore, the number of Indonesian citizens applying for a patent (per US$ trillion of gross domestic product (GDP)) is equal to Singapore and higher than Thailand.

The Knowledge Sector Initiative (KSI) is a joint initiative between the Governments of Indonesia and Australia that aims to improve the quality of public policy in Indonesia through research, analysis and data. To achieve this goal, KSI conducts capacity building programs for research institutions; creates systems and regulations to support research-based policy making; develops effective models for conducting research and using research results in policy-making processes; and collaborates with various organisations to expand access to research data for policy makers, including government, community organisations and the media.

Quality scientific works and contributions to the development of public policies in Indonesia draw serious attention from Australia as a friendly nation. The challenge that should be answered by the Indonesian Government (in this case the Ministry of Research, Technology and Higher Education/Kemenristekdikti) and the universities is how to direct and optimise the research results from universities and research institutions to be used as references in policy recommendations.

Chart 1: Number of Registered Patents in Indonesia



Source: Directorate of Patents, Directorate General of Intellectual Property Rights, Ministry of Law and Human Rights, 2010.

The expected long-term outcome is 'the identification and mitigation of systemic barriers to the effectiveness of the knowledge sector' by encouraging investigations and discussions on key constraints and supporting efforts to remove these barriers. This effort is in line with the objective of the KSI program, namely to create an enabling environment.

1.2. Research problem

What are the key barriers for research performance in universities in Indonesia?

1.3. Objectives

This research aims to:

1. Diagnose barriers to research in universities in Indonesia and highlight the short-term efforts implemented by the universities to address these obstacles (coping mechanisms).
2. Examine the causes of problems at conceptual and philosophical levels.
3. Formulate advocacy strategies and disseminate research findings for policy changes.
4. Formulate interventions in the change process.

2 Conceptual Framework, Basic Assumption and Research Questions

2.1. Conceptual framework

Based on preliminary discussions, eight issues were selected as the focus of the study:

1. Alignment
2. Research funding
3. Research agenda priority
4. Human resources for research and research 'career'
5. Remuneration and incentive systems for researchers
6. The credit system (*kum*)
7. Publication and research schemes for policy
8. Research management.

Each issue will be explored at three levels: (i) structural system (e.g. state/government policy, research and funding structure, support for deeper research, etc.); (ii) modalities (e.g. university rules and regulations, facilities, research management, research space facility, etc.) and (iii) individuals (e.g. performance of ongoing research, qualifications, capacity, networks, etc.) (Nugroho et al. 2016). KSI will explore institutional barriers at the institutional level, that is, research centre/faculty/university and higher institutions (Kemenristekdikti or other relevant institutions) in transforming research results into policy processes.

2.2. Basic assumption

Universities' attention to research is low, compared to other aspects of the Tri Dharma of higher education (teaching, learning and community service).

2.3. Research questions

- Why do universities have low performance in terms of research quantity and usefulness? What factors hamper research performance in universities?
- What factors can improve research performance in universities?
- What are good practices that can be used as a model for dealing with research barriers?
- What are the expectations of and opportunities for universities and researchers to improve research performance in Indonesia?

3 Research Methodology

3.1. Research context

This research was conducted in University of Indonesia (UI). Given the size of UI, a number of work units or individuals were determined as research subjects. The research subjects were work units or individuals that were considered capable of describing the research performance of UI, including through international publications indexed in the Scopus database. Based on the number of publications accepted by the Scopus index, there are currently 4,237 documents from UI[1]. These figures do not include UI's joint publication with Cipto Mangkusumo Hospital, with a total of 480 publications. With this number, UI is ranked second in Indonesia under the Bandung Institute of Technology (ITB), which has 5,197 indexed publications. All publications from UI are from the period 1977-2016, with most of them from the period 2000-2016 (3,542 publications). There were 695 publications from the period before the year 2000. The increase in publications since 2000 cannot be separated from the shift in UI status into a State Owned Legal Entity (BHMN) based on Government Regulation No. 152/2000 as a follow up to Government Regulation Number 61 Year 1999. The change of status into BHMN brought significant changes for UI, including greater autonomy in academic development and financial management.

From the time UI gained BHMN status until 2012, there were 2,005 publications indexed in Scopus. Most of those (1,419 publications) were produced during the time of Prof. Dr. Gumilar Rusliwa Somantri (2007-2012). In 2012, UI's status changed into State University as Legal Entity (PTN-BH) as a result of the enactment of Law No. 12 of

1 www.scopus.com, data per 2 February 2016.

2012 on Higher Education. From 2013-2014, UI listed 999 publications in the Scopus index. Under the current rector, Prof. Dr. Muhammad Anis, whose tenure runs from 2014 until 2019, there have been 538 publications indexed in Scopus (as at February 2016). Based on these data, the development of research performance in UI increased significantly in the era after 2000 as a result of its status as BHMN and then PTN-BH. During this time, UI was proclaimed a world-class research university. As such, UI must perform a number of internal improvements, including improving database performance for its academic community. From the organisational structure perspective, UI currently consists of 14 faculties, one graduate program, and one vocational program. The study program in UI currently contains 58 undergraduate programs, six professional programs, 68 master's programs, 37 doctorate programs, and 11 vocational programs. In 2014, the number of students reached 48,761 students, with 700 of those being foreign students (international class).

Each faculty records its own research performance. There are faculties with high research performance, while others have middle to low performance. In addition to faculties, research at UI is conducted by research centres at the university, faculty and department levels. Based on these considerations, the subjects in this study were: (i) Directorate of Research and Community Service UI (DRPM UI) as an organisational unit responsible for formulating policies and developing and managing research activities at the university level; (ii) Faculty of Engineering (FT) as one of the faculties with high research performance, represented by a research and community service manager; (iii) Faculty of Humanities (FIB) as one of the faculties with low to moderate research performance, represented by the research and community service manager; (iv) Research Centre for Climate Change UI (RCCC UI) as a university research centre; (v) Papua Center as a research centre at the Faculty of Social and Political Sciences (FISIP); (vi) Centre for Political Science Studies (Puskapol) as a research centre under the Department of Political Science; and (vii) a researcher at FISIP who was a team leader in a previous study similar to this one.

3.2. Research design

This research applied the case study design (multiple, embedded case study). The focus of the case study was research initiatives in UI, especially those managed by certain institutions in UI, namely DRPM, FT, FIB, RCCC, the Papua Center and Puskapol.

3.3. Analysis unit

The focus of this research is on the university and faculties, as well as research centres at the university, faculty and department levels. The selection of faculties was based on research performance representation. A faculty representing faculties with high research performance and another faculty representing faculties with low to moderate research performance were included. The research centres were also selected based on representation of research centres at the university, faculty and department levels.

3.4. Informants and research sample

Considering the size of UI, the subjects of this research were purposely selected: (i) DRPM UI, represented by the Sub-Directorate of Research Planning and Development (Scopus h-index: 5); (ii) FT, represented by the Research and Community Service Manager (Scopus h-index: 7); (iii) FIB, represented by the Research and Community Service Manager; (iv) RCCC, represented by its directors (Scopus h-index: 16); (v) Papua Center, represented by its director (Scopus h-index: 1); (vi) Puskapol, represented by the Deputy Director and Research and Data Centre Manager, a researcher at FISIP who was a team leader for a similar study to this

one (Scopus h-index: 2), and (vii) Vice Rector for Research and Innova tion (Scopus h-index: 10), accompanied by one of his staff members (Scopus h-index: 10).

3.5. Data collection

Primary and secondary data were collected for this study. Data were collected through:

1. Overview of secondary documents concerning research profiles in UI.
2. In-depth interviews with a number of Informants in DRPM, FT, FIB, RCCC, Papua Center, Puskapol, a researcher from FISIP, and the Vice Rector for Research and Innovation.

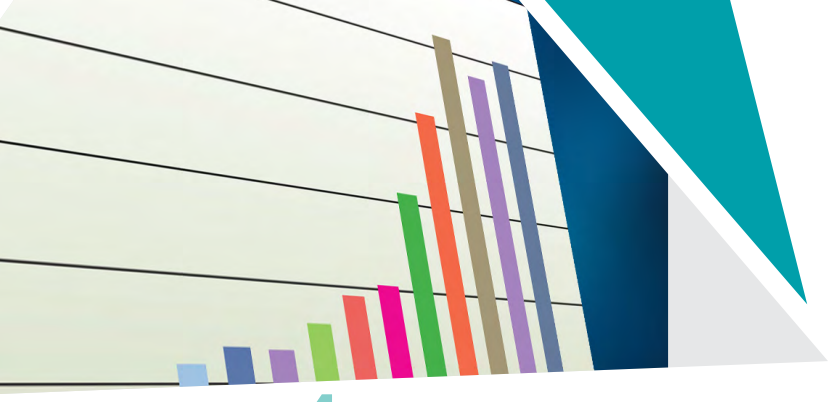
The study participants were lecturers, researchers and decision makers at the university and faculty levels.

3.6. Data analysis

Data were analysed using a pattern-matching method. The information obtained was used to confirm or reject the proposition. In addition, the information collected sought to illustrate the eight issues of research performance and usefulness barriers/causes. Cross-case analysis was applied to compare findings in each case.

3.7. Research ethics

There were a number of sensitive issues in the implementation of this research. Some related to strategies applied by the institution, which for various reasons cannot be revealed. Therefore, reporting the research results attempts to accommodate a number of sensitive issues and provide an explanation for the issues raised in this study. This research was performed officially, with researchers (the authors) equipped with an assignment letter from KSI. Before meeting the Informants, the researchers first sent an interview request letter. Thus, the Informants had agreed to meet and interviewed by the researchers. In addition, to ensure the confidentiality of the Informants, the information only referred to their positions, with no names mentioned.



4 Findings

4.1. Research performance in UI (quantity and usefulness)

Based on the 'University of Indonesia Strategic Plan 2015-2019' document, UI's vision is 'Establishing University of Indonesia as an independent and superior PTN-BH that is capable of resolving problems and challenges nationally and globally as an elite university in Southeast Asia'. This vision reflects UI's efforts to become an excellent institution in solving various problems and challenges at the national and global levels. Research will play a significant role in achieving the vision. All research conducted by the UI academic community must be good quality and relevant to national and global challenges.

UI has set a number of priority programs in the field of research. These programs are set to address various gaps or weaknesses in the field of research. In the 2015-2019 strategic plan document various gaps were revealed:

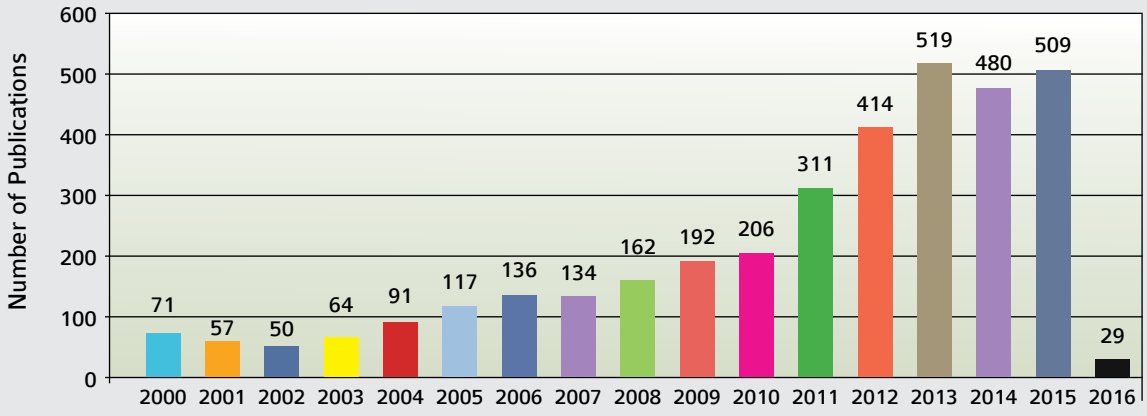
- UI's productivity in generating international publications, government policy reviews and intellectual property rights products (including patents) as a world class research university is still low;
- The number of research studies, applied studies and product innovations that can be patented is low, as is the number of patents that can be used or commercialised by government, industry and society;
- Research is not consistent, and there is no development road map in the university environment or the faculty/research centre where research activities are performed. Research is done reactively, based on incidental requests;
- There is no integrated research and patent program in UI (inter-disciplinary, multi-disciplinary), between research centres and between faculties;
- Coordination of research activities among research units is weak;
- Lack of human resource commitment in UI on research activities, especially among core research lecturers;

- Promotion and dissemination of research and development results is still limited;
- There are no strategic plans from publishing entities (UI Press and UI's Faculty of Medicine and Faculty of Economics publishers) that help increase the number of publications of UI lecturers and researchers;
- Very few professors and foreign guest researchers in UI;
- Very few UI lecturers and researchers who go abroad;
- Very few lecturers of vocational education programs that produce applied research in collaboration with professional and industrial associations;
- Community service policies and governance system have not been able to attract maximum cooperation projects;
- Allocation of resources for community service programs does not consider comprehensive educational and research activities;
- Cooperation opportunities with third parties (government or industry) must be taken advantage of;
- Synergy and coordination between units in collaboration, utilisation and governance need to be improved;
- The participation rate of undergraduate students in lecturers' research projects is not yet satisfactory;
- Latest research laboratory facilities and infrastructure are not able to support world class research; and
- Lack of research that is oriented towards solving the country's problems.

Despite these gaps, UI's research performance is the best in Indonesia, at least in terms of publications recorded by international ratings agencies such as the Scopus database, and UI's rating according to Webometrics, the Times Higher Education World University Rankings, and the QS World University Rankings. Based on data recorded in Scopus, the number of publications produced by lecturers/researchers/research institutions from UI has reached 4,237. This figure does not include UI's 480 joint publications with the Cipto Mangkusumo Hospital. With this total amount, UI is ranked second among universities with most Scopus-indexed publications in Indonesia, behind ITB with 5,197 documents. Universitas Gadjah Mada (UGM) is third with 2,792 documents.

Of all UI publications, 4,237 were from the period 1977-2016. In that 39-year period, most publications (3,542) came from 2000-2016. During the period 1977-1999 only 695 publications were generated (see Chart 2).

Chart 2: Number of Scopus-indexed Publications in UI 2000-2016



Source: www.scopus.com, accessed 1 February 2016

UI's performance can also be viewed from its rank according to a number of rating agencies, such as Webometrics, the Times Higher Education Rankings and QS. According to Webometrics, based on data in early 2016, UI is ranked 758th in the world, and first in Indonesia. Second is ITB, which is ranked 796th globally. The third position is occupied by UGM which ranked 802nd globally.

Data published by the Times Higher Education World University Rankings 2016 put UI as the only university in Indonesia in the world's top 800. It is ranked 601 out of 800. When categorised into the BRICS and Emerging Economies category by the same institution, UI is ranked 171st out of 200 universities in the world and is the only representative from Indonesia. Another rating agency, QS, which released 2015/2016 world university rankings, ranked UI at 358th in the world and 79th in Asia. In that ranking, UI is also ranked 301st out of 400 in the world for medicine, and 215th in the world for social science and management. The rating is the highest in Indonesia. By comparison, ITB is ranked 431st out of 440 in the world and UGM is ranked 551st out of 600 in the world.

Research performance in UI can be viewed from the amount of available research funding and the amount of research proposals funded. Research funding in UI is usually distributed in the form of grants by DRPM. There are three types of grants in UI that are managed by DRPM: (1) internal research grant funded from UI's budget, both from public funds and those provided through the Directorate General of Higher Education; (2) external research grants funded by other institutions, especially from LPDP, Ministry of Agriculture (Kementan), Ministry of Research and Technology (Kemenristek), and Directorate General of

Table 1: Amount of Research Funding in UI in 2012-2014 (in Rupiah)

Type of Grant	Year		
	2012	2013	2014
Internal research grant	18,457,347,885	33,990,362,967	32,394,725,229
- Community funding	12,917,675,553	6,799,969,967	-
- Dikti	5,539,672,332	27,190,393,000	32,394,725,229
External research grant	10,983,025,650	12,960,290,000	30,314,290,374
- LPDP	-	-	17,354,000,374
- Ministry of Agriculture	-	134,120,000	134,120,000
- Ministry of Research and Technology	2,630,000,000	2,630,000,000	2,630,000,000
- Dikti	8,353,025,650	10,196,170,000	10,196,170,000
Collaborative research grant	5,371,687,369	5,609,988,263	5,291,263,684
- Research centre	345,436,842	234,310,526	240,000,000
- Laboratory	961,345,263	500,000,000	442,190,000
- National collaboration	1,474,852,632	1,464,672,999	731,500,000
- International collaboration	2,590,052,632	3,411,004,738	3,877,573,684
Total amount of grants	34,812,060,904	52,560,641,230	68,000,279,287

Source: UI Yearly Report 2014 (data reprocessed)

Higher Education[2]; and (3) research grants funded by collaboration between UI and other parties such as research centres, laboratories and national and international collaborations.

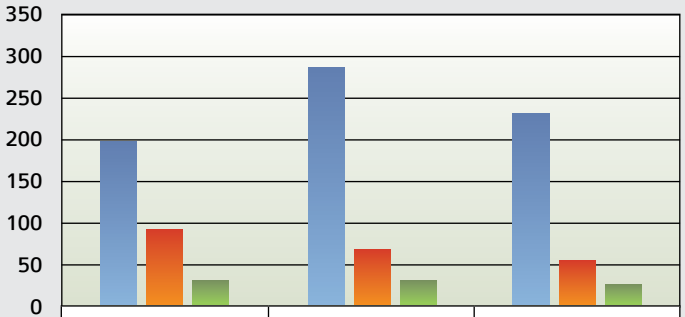
As seen in Table 1, in the period 2012-2014 the total annual research budget managed by UI increased from Rp 34.8 billion in 2012 to Rp 52.6 billion in 2013. In 2014, the research budget increased again to Rp 68 billion. In terms of funding sources, internal UI budgets reached 53.02 percent in 2012, 64.67 percent in 2013 and 47.64 percent in 2014. The decline in internal funding in 2014 was due to external funds coming from LPDP. The contribution of collaboration funds to the total UI research fund is the smallest and tends to decrease every year.

The small amount of research funding reflects the low level of collaboration between UI research institutes (and UI researchers) and external research institutions (and external researchers), both domestically and abroad. Research collaboration can be used to exchange ideas, knowledge and experience, and to expand the access of UI research institutes and researchers to the international academic community. This access can facilitate UI research institutes and researchers to introduce and disseminate research results conducted by the UI academic community. The number of research studies funded through research funds during 2012-2014 can be seen in Chart 3.

Based on Chart 3, there were 320 research studies funded in 2012. There were 387 studies funded in 2013 and 317 in 2014. Data shows a decrease in the number of research studies funded, although the amount of available research funding tends to increase, as seen in Table 1. Research is mostly funded internally: 61.56 percent in 2012, 74.16 percent in 2013 and 73.5 percent in 2014.

Research is expected to produce publications or products that can be used to solve various problems in the community. The number of research outputs produced by UI is shown in Table 2, based on the UI Database for Research and Community Service (*Sistem*

Chart 3. Number of Proposals Funded through UI Research Budget 2012-2014



	2012	2013	2014
	Year		
Internal Research Grants	197	287	233
External Research Grants	93	70	56
Collaborative Research Grants	30	30	28

Internal Research Grants External Research Grants Collaborative Research Grants

Source: UI Yearly Report 2014 (data reprocessed)

2 Before President Joko Widodo's term, the Ministry of Research, Technology and Higher Education and the Ministry of Research and Technology; and Dikti (Higher Education) were separate entities. Dikti was under the Ministry of Education and Culture.

Informasi Database Riset dan Pengabdian Masyarakat, SIRIP). This can be accessed at http://sirip.ui.ac.id/sidr/statistik-home/. Data in Table 2 reveal that 7,530 studies have been published in both national and international journals. The data also show that 8,174 papers were presented in scientific activities, 1,487 papers were written into textbooks, and 233 received intellectual property rights (*Hak Kekayaan Intelektual*, HKI).

Research at UI is conducted by existing research centres at the university, faculty and departmental levels, both in groups and individually. Research centres in UI are regulated through the UI Rector's Decree (SK) Number 1320/SK/R/UI/2009 on Research Centres in University of Indonesia. This decree was issued to create a conducive academic climate for the implementation of quality research. The Decree emphasises the need for guidance to research centres in UI. The Decree states that there are 43 research centres in UI that are allowed to operate, as listed in Table 3.

There are a number of variations at research centres, for example in research centres in FT, FISIP and at UI levels. At FT, there are currently three research centres: (1) the Centre for Sustainable Infrastructure Development Studies; (2) the Tropical Renewable Energy Research Centre, and (3) the Biomedical Engineering Research Centre. In this faculty there are also a number of ventures such as the FT UI Technology Institute and Career Development Centre. In FISIP, four new research centres have been established: (1) the Centre for Election and Political Parties; (2) the Centre for Child Protection Studies; (3) the Papua Center, and (4) the ASEAN Study Center. Two centres are

Table 2: Number of Research Outputs in UI

Faculty	Journal Article	Paper	Textbook	HKI
Faculty of Computer Science	212	564	28	15
Faculty of Mathematics and Natural Science	1,099	88	12	10
Faculty of Economics	225	304	26	-
Faculty of Psychology	101	297	66	-
Faculty of Humanities	276	705	164	-
Faculty of Law	219	224	76	2
Postgraduate Program	96	35	38	6
Faculty of Dentistry	239	947	14	36
Faculty of Medicine	2,319	2,277	456	41
Faculty of Social and Political Science	782	509	444	17
Faculty of Nursing	134	178	43	54
Faculty of Pharmacy	260	219	30	3
Faculty of Public Health	128	157	42	14
Faculty of Engineering	1.440	1,670	48	35
Jumlah Total	**7,530**	**8,174**	**1,487**	**233**

Source: Data processed from http://sirip.ui.ac.id/sidr/statistik-home/ accessed 6 February 2016

not active, namely the Centre for Development of Autonomy and Local Communities, and the Centre for Development Studies of Regional and City Administration. With the establishment of the Faculty of Administrative Sciences in March 2015, the Centre for Administration Studies is no longer under FISIP. It is now under Administrative Sciences. At the university level, a number of new research centres, such as the Research

Table 3: Research Centres in University of Indonesia

Research Centres at University Level	Research Centres at Faculty Level
1. The American Studies Center 2. Japanese Studies Center 3. Centre of European Studies 4. Centre of Middle East and Islamic Studies 5. Centre of APEC Studies 6. Centre of Regional Nutrition Studies 7. Centre of Strategic Issues Studies 8. Governance Studies 9. Centre of Women's Studies	**A. Faculty of Medicine** 1. Integrated Laboratory 2. Clinical Study Unit
	B. Faculty of Math and Natural Sciences 1. Computer and Information Technology Research Centre 2. Environmental Risk and Safety Research Centre 3. Centre for Marine Studies 4. Biodiversity and Conservation Study Centre 5. Centre for Applied Geographic Research 6. Natural Medicine Research Centre 7. Mineral Studies Research Centre 8. Geoscience Centre 9. Research Synergy and Business Centre 10. Center for Excellence Indigenous Biological Resources Genome Studies (CoE IBR-GS)
	C. Faculty of Law Djokosoetono Legal Research Centre
	D. Faculty of Humanities Culture and Society Research Centre
	E. Faculty of Psychology 1. Psychological Research and Development Institution 2. Crisis Centre
	F. Faculty of Social and Political Science 1. Centre of Communication Studies 2. Gender and Sexuality Research Centre 3. Center for International Relations Studies 4. Community and Local Autonomy Development Research Centre 5. Centre for Political Studies 6. Center for Research on Inter-Group Relations and Conflict Resolution (CERIC) 7. Socio Lab 8. Centre for Anthropological Studies 9. Centre for Administration Science Studies 10. Centre for Urban and Rural Administration Development Studies 11. Centre for Criminology Studies 12. Center for Global Civil Society (PACIVIS) 13. Centre for Social Welfare Studies 14. Centre for Disability Studies
	G. Postgraduate Program 1. Centre for Human Resources and Environment Studies 2. Centre for Strategy and Defence Studies 3. Centre for Biomedical Technology Application Studies 4. Center for Police Research (Pusat Riset Ilmu Kepolisian)

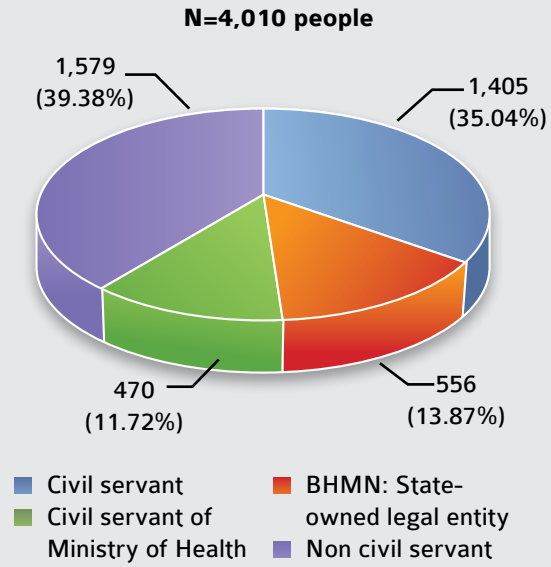
Source: Decree of Rector UI Number 1320/SK/H/UI/2009

Centre for Climate Change (RCCC), the Centre for Aging and Development, and the Centre for Malay Tamadun Studies were established. In addition, there were changes in nomenclature and focus of study, such as Governance Studies into the Centre for Study of Governance and Administrative Reform (UI CSGAR).

In addition to research centres, there are a number of laboratories in UI that support the implementation of research. In the Research Master Plan document, UI mapped the existence of laboratories in its environment in 2008. The mapping stated that there are 203 laboratories in UI across 12 faculties. Of these, as many as 45 laboratories (22 percent) have received accreditation from the National Accreditation Committee (*Komite Akreditasi Nasional* KAN), National Accreditation Board of Higher Education (BAN-PT) and private assessors. The mapping also reveals that based on their function, most laboratories are used for educational purposes (50 percent) while the remainder perform the following functions: research (11 percent), community service (1 percent), education and research (18 percent), education and community service (4 percent), research and community service (0.5 percent), and education, research and community service (16 percent). Currently, it is noted that 22 research laboratories are distributed among six faculties, namely the Faculty of Computer Science/Fasilkom (8 laboratories), Faculty of Mathematics and Natural Sciences/FMIPA (7 laboratories), Faculty of Psychology/FPsi (3 laboratories), Faculty of Medicine (2 laboratories), FT (1 laboratory) and Faculty of Dentistry (1 laboratory). To strengthen function and enhance research laboratories' contribution, UI improves the laboratories' status, research, measurement service, and consultation laboratories for external parties, according to the Research Master Plan document.

Research implementation cannot be separated from the availability and capacity of research resources. Research activities in UI are conducted by lecturers as a part of Tri Dharma perguruan tinggi (the three functions of a higher education institution). Currently, UI has lecturers with civil service status, BHMN status, Ministry of Health civil service status and non-civil servants. In 2014, the total number of UI lecturers reached 4,010. However, more attention should be given to the data of lecturers who are actively involved in research activities. This data is important as a reference for UI to further examine the balance of a lecturer's function in carrying out the Tri Dharma perguruan tinggi. The composition can be seen in Chart 4.

Chart 4. Composition of UI Lecturers in 2014



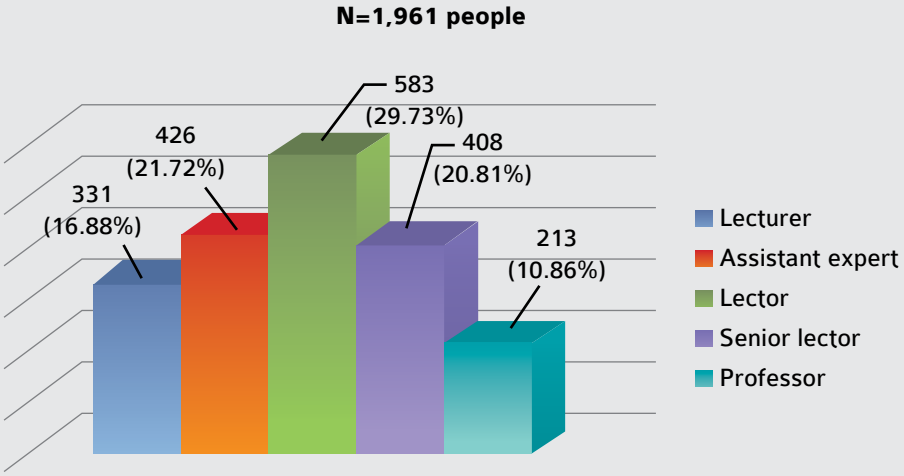
Source: UI Yearly Report 2014 (data reprocessed)

Of the 4,010 lecturers in 2014, 1,961 were civil servants and BHMN employees. Chart 5 shows the composition of civil servants and BHMN lecturers based on their academic positions.

4.2. Driving factors for research performance improvement in UI

Based on the performance described in the previous section, there have been significant developments in research or

Chart 5. Civil Servant and BHMN Lecturers in 2014 by Academic Position



Source: UI Yearly Report 2014 (data reprocessed)

research activities in UI. Using the approach used by Nugroho et al., the authors attempt to describe a number of drivers for research performance improvement in UI from the perspectives of structure/system (e.g. state/government policies, research and funding structures, support for deep research, etc.); (ii) modalities (e.g. university rules and regulations, facilities, research management, facilitation of research spaces, etc.), and (iii) individuals (e.g. performance of ongoing research, qualifications, capacity, networks, etc.).

In the case of UI, the structural factors that contribute to research performance are: (1) government policy to make UI a BHMN and then PTN-BH; (2) the *Pendidikan Tinggi* (Dikti) policy on competitive research grants; (3) the policy on lecturer's assessment credits for promotion which emphasises lecturers' research results; and (4) the Circular Letter of Dikti No. 152/E/T/2012 which requires students to publish scientific work (minor-thesis, thesis and dissertation) in reputable internationally and nationally accredited journals in order to graduate, especially for graduate students or master's degree students.

The stipulation of UI status as BHMN under Regulation No. 152 of 2000 has changed the management of the university. By being a BHMN, UI has greater autonomy in developing its academic and financial management. After the BHMN status, one of the steps taken by UI was to restructure institutions, including research management institutions. The UI rector during the period 2002-2007, Usman Chatib Warsa, issued Rector Decree No. 047/SK/R/UI/2003 establishing the Directorate of Research and Community Service (DRPM) as an organ whose main duties and functions were research and community services. DRPM was formed to take over the duties and authority of UI's Research Institute (LPUI) and UI's Institute of Community Services (LPMUI). During the early period, DRPM activities focused on improving the quality of the research climate in UI and began to apply the concept of multi-disciplinary research through a number of research programs, in partnership with external parties.

Another government policy that encouraged improved performance during the time when UI had just become a BHMN was a government commitment to provide research grants through a competitive grant

scheme of the Directorate General of Higher Education, and the Ministry of Research, Technology and Higher Education. This government research grant policy was followed up by UI allocating its own funds to finance quality research proposals through superior research programs (*program riset unggulan*). In practice, DRPM coordinates with the manager of research at the faculty level in an effort to consolidate a move towards an international research environment. Another step was writing research proposals for competitive grants from institutions outside of UI, and giving awards to researchers who had published their research in international journals. These were efforts to trigger increased quantity and quality of research activities. UI also began to improve its library facilities to support research activities, including open access for lecturers and researchers to obtain academic references easily and free of charge. UI activated online reputable international journal subscriptions.

Another government policy that promotes research performance improvement is the lecturer assessment credit for promotion. According to a number of informants, this policy has succeeded in encouraging lecturers to increase their research activities, although there are still many lecturers who are indifferent to it. The following quote from an interview reflects this:

> "We've had a special interview for that. Indeed, there are some lecturers who only do research because they want a promotion. We are really aware that they cannot be promoted without doing any research and community service. But if lecturers do not care about promotion, they just ignore it. And there are many of that type of lecturer." (In-depth interview with FIB's Research and Community Service Manager).

Government policies on publication being a graduation requirement through the Directorate General of Dikti Circular Letter No. 152/E/T/2012 is a driver of research in UI, especially for graduate students. Referring to the Circular Letter, UI issued an implementation rule in 2013 through the Rector Decree No. 2199/SK/R/UI/2013 for master's students, and the Rector Decree No. 2200/SK/R/UI/2013 for doctoral students. Both decrees regulate publication obligations as a requirement for graduation.

The following interview excerpt explains this:

> "Although it may be interpreted disparately, in my opinion the Rector decree of 2013, if I am not mistaken ... 2013 or 2012, states that graduate [students] should have an article published in an international publication. It is one of the implementation rules and a motivation from the upper level too." (In-depth interview with the Head of DRPM Research Planning and Development Sub Directorate).

In addition to structural factors, this study reveals that modality factors related to support from institutions, in this case UI, also determine the performance of research. The study on the research performance of UI concluded a number of modality factors that contribute to research performance in UI: (1) establishment of the Board of Trustees (MWA) and policies produced by the board; (2) UI strategic policies as set out in the Long-Term Development Plan 2015-2035 of UI; (3) UI Strategic Plan 2015-2019; (4) UI's commitment to improve research performance defined in the UI Research Road Map; and (5) research culture and performance development programs that are performed by faculties and research centres in UI.

As explained in the structural factor section, policies at the government level have been followed up through a number of measures and internal policies at the UI level. As BHMN, which later became PTN-BH, UI has a vital organ, the MWA. One of the tasks of the MWA is to set out general policies in UI after consideration by the Academic Senate and the Council of Professors. These policies guide the rector

in the function of overall management of the university; carrying out education, research and community service processes; fostering the academic community (faculties and students); and fostering relationships with alumni in the university and in society. MWA has issued at least 18 policies related to research management in UI:

1. MWA UI Decree Number 006/SK/MWAUI/ 2002 on General Policies on Development Direction of UI 2002-2004
2. MWA UI Regulation Number 003/Peraturan/ MWA-UI/2005 on Research Policy of University of Indonesia
3. MWA UI Regulation Number 005/Peraturan/ MWA-UI/2005 on Research Human Resource Policy in University of Indonesia
4. MWA UI Decision Number 007/Tap/MWAUI/2005 on Research Ethics for All Academic Communities of University of Indonesia
5. MWA UI Decision Number 009/Tap/MWA-UI/2005 on Research Norms of University of Indonesia
6. MWA UI Decision Number 010/Tap/MWA-UI/2005 on Academic Performance Indicators in University of Indonesia towards World-class Quality and Procedures for Achievement
7. MWA UI Regulation Number 002/Peraturan/MWA-UI/2006 on Policy on Research Centres in University of Indonesia
8. MWA UI Regulation Number 004/Peraturan/MWA-UI/2006 on Principles of Development of University of Indonesia 2007-2022
9. MWA UI Regulation Number 005/Peraturan/ MWA-UI/2006 on Research University Norms
10. MWA UI Regulation Number 006/Peraturan/MWA-UI/2006 on Science Development in University of Indonesia
11. MWA UI Decree Number 005/SK/MWA-UI/2007 on General Policies for UI Development Directions 2007-2012
12. MWA UI Decree Number 002/SK/MWA-UI/2008 on Research University Norms
13. MWA UI Decree Number 003/SK/MWA-UI/2008 on Research Policy of University of Indonesia
14. MWA UI Decree Number 009/SK/MWA-UI/2008 on Refinement of UI MWA Decree Number 003/SK/MWAUI/2008 on Research Policy of University of Indonesia
15. MWA UI Decree Number 011/SK/MWA-UI/2008 on on Research University Norms
16. MWA UI Decree Number 002/SK/MWA-UI/2010 on Research Culture Norms of University of Indonesia
17. MWA UI Decree Number 006/SK/MWAUI/2010 on Refinement of Academic Performance Indicators of University of Indonesia towards World-class Quality and its Achievement Procedures
18. MWA UI Decree Number 009/SK/MWAUI/2012 on General Policy on Development Direction of University of Indonesia 2012-2017

Those MWA general policies are then operationalised through a number of rector's regulations or decrees. Various MWA policies show adequate institutional support, which in turn will impact research performance. Important policies issued by the Rector of UI to follow up the MWA policy, especially during the leadership of the current rector, are the UI Long-Term Development Plan 2015-2035 (UI RPJP) and the UI Strategic Plan 2015-2019. Both contain a number of UI policy directives in the implementation of research and community service.

Based on the UI RPJP 2015-2035 document, the focus on long-term development programs in UI is Tri Dharma perguruan tinggi, with superior quality in a number of development areas such as research, innovation and community service. Analysis of UI RPJP 2015-2035 reveals cohesion and mutual support among the various areas of development. In research

and innovation, there are a number of important directives, such as:

(1) Research development is supported by the quality of research planning and management as well as fund allocation that follows the principle of budget autonomy.
(2) Advanced, innovative and efficient science development that generates breakthroughs in thinking (IPR, patents).
(3) Applied research devoted to community and outreach programs (students, faculties and institutions) to contribute to solving the nation's issues around sustainable development, enforcement of socio-economic rights and justice, restoring human dignity, and socio-ecological disaster issues.
(4) Excellent research that can be operated independently, in combination or intersecting, categorised into four groups: (i) indigenous study, which focuses on research regarding local knowledge and wisdom to address local issues and concerns and is able to be promoted at the global level; (ii) science and technology, focusing on natural science-based knowledge innovations and breakthroughs and their implementation to contribute to the issues and concerns of the nation; (iii) health and genome, which focuses on aspects of public health in Indonesia, as well as to make breakthroughs and innovations to solve public health issues; and (iv) social, political, economic and legal research which focuses on aspects of the social, political, economic and legal pluralism of Indonesian society.

The UI Strategic Plan 2015-2019 gives an overview of the goals, strategic objectives, programs and key performance indicators (KPIs) set forth to achieve the goals and strategic objectives. There are at least five objectives, three strategic targets, seven basic programs and 13 KPIs that relate to research in the UI Strategic Plan 2015-2019, as listed in Table 4.

In addition to internal policies that are created by UI, there are a number of other modality factors that support research performance, namely UI's consistency in the implementation of research grants, incentives, collaborative efforts, road map and independent efforts and breakthroughs from a number of faculties in developing a research culture and facilitating research management and publication. In terms of implementation of research grants, incentives, collaborative efforts and research road map, under the leadership of Rector Usman Chatib Warsa (2002-2007), and until now, UI has consistently provided grants. The grants awarded annually present an increase in both the type of grant and the amount of funds disbursed. In 2015, there were 13 types of grants offered to the academic community of UI, as shown in Table 5.

In addition to the grants in Table 5, in 2015 there was also international seminar support for oral presentations; support for UI research centre facility development; support for faculties who gain international grants; UI Community Engagement Grants (CEGs) 2015; article writing training management; book writing; UI area-based CEGs; and community service collaboration. UI's consistency is also evident from the provision of incentives in the form of awards to professors who successfully publish scientific work, in collaboration with external parties, especially those from abroad. A research road map was also prepared.

Other modalities include independent efforts and breakthroughs from a number of faculties in developing the research culture and facilitating research management and publication. In this case the authors want to specifically focus the discussion on the condition in FT (Faculty of Engineering) and FIB (Faculty of Humanities), which become the locus of this study. Based on a number of

Table 4. Objectives, Strategic Targets, Basic Programs and KPIs for Research

Objective	Strategic Target	Basic Program	KPI
• Develop and distribute science, technology and culture, and make efforts to improve the dignity and life of society and to enhance national culture. • Encourage and support the active involvement of the academic community in development and community service, with results that are democratic, prosperous and moral. • Strengthen the role as the implementer of higher education and collaborate with professional institutions and associations so that alumni can gain professional skills. • Increase the quantity and quality of services to the nation, state and world, through collaboration, partnerships and opportunities to enhance sustainable culture and continuing education. • Invest in professional development for all UI society and in useful technology that will help to achieve superiority through teaching, research and community service.	• Improve research culture and quality; entrepreneurial spirit; innovation; be effective and efficient; create breakthroughs in mindsets that can be applied through community service to support the nation's independence and provide solutions to national and global problems, especially evidence-based practices that can be implemented in real contexts as a practical way to serve society. • Strengthen human resources based on ethics and oriented to performance, integrity and academic community integration to produce superior performance. This is the most important factor in education and research. • Strengthen collaboration and partnerships in education and research, and between education and research, in an academic climate that is dynamic and without boundaries.	• Increase the capacity, quality and productivity of research, community service and innovation in UI (knowledge discovery and knowledge development). • Strengthen governance and integrated management systems. • Increase income outside of tuition fees, improve cost efficiency and create integrated and efficient financial management. • Strengthen human resource professionalism. • Increase partnerships with other universities, alumni, media, professional/scientific associations, NGOs, environmental and culture activists, communities, industry and government. • Increase the quality and quantity of facilities and infrastructures. • Increase integrated information systems and technology services.	• Increased percentage of budget allocation for research and community services per year. • Increased number of indexed or cited international scientific publications. • Increased number of HKI in UI. • Increased number of community service activities per year. • Increased average number of citations per academic staff per year. • Increased number of textbooks/teaching manuals/scientific books produced to be used in learning per year. • Increased number of centres of excellence that support UI to become the centre of excellence in Asia. • Established innovation center. • Improved financial management facilities and infrastructures and effective and efficient ICT. • Availability of blue print for UI employment. • Promote achievement of UI as a cyber campus. • Availability of UI's facilities and infrastructure. • Increased quality of partnerships and collaboration with various parties, both domestically and internationally, creating synergy to address issues in the country and research challenges globally.

Source: UI Strategic Plan 2015-2019 (data reprocessed)

Table 5: Type of Grants in UI in 2015

No.	Type of Grant	Maximum amount (in million IDR)	Number of proposals passed administrative selection
1	Multi-disciplinary research	200	120
2	Initial research	40	66
3	Cluster research	300	31
4	Graduate/postgraduate research	80	146
5	National collaborative research	150	50
6	International collaborative research	220	31
7	Laboratory safety standard development	100	9
8	Faculty research centre capacity building	125	1
9	University research centre capacity building	225	2
10	Preparation for accreditation/ISO standards for faculty laboratories	50	4
11	Laboratory infrastructure	250	22
12	UI research centre internationalisation acceleration program	220	1
13	Aids for global research initiative program	150	4

Source: http://research.ui.ac.id/research/category/skema2015 (data reprocessed)

indicators, FT and the Faculty of Medicine are thought to have high research performance, including scientific publications in international journals. One of the factors making FT a high-performance faculty is the research culture that has been built since 1997 through a 30-hour program linked to a remuneration system, as stated in the following interview quote:

> "I think the starting point was in 1997. Actually, the turning point was when the previous Dean, Professor Joko Hartanto, introduced and began implementing a program of 30 hours, at that time. Back then a lot of lecturers were still teaching outside UI, working as consultants, we called it '*ngasong*[3]." After he introduced the program, every faculty had to commit at least 30 hours on campus, meaning that 30 hours of teaching was mandatory. The remaining time was used for preparing research proposals and supervising students. It was a minimum of 30 hours. Arguably, 30 hours were not too much. We already did that. With a 30-hour formulation, lecturers who were busy outside started to come back here, because he said it was related to remuneration. At that time, UI was not familiar with the system, however, this faculty had already imposed it." (In-depth interview with the FT Research and Community Service Manager).

The 30-hour program later increased to 40 hours. Through the mechanism of minimum presence on campus, FT encouraged lecturers to be on campus and carry out the task of Tri Dharma perguruan tinggi and associate it with remuneration. The result, according to the FT Research and Community

3 Originally from Sundanese, the language of West Javanese people. Asong or ngasong means to offer. Street vendors are called pe-ngasong.

Service Manager, was that 85 percent to 90 percent of lecturers currently work on research in FT. In addition, FT always announces the number of publications and grants received by departments to encourage the departments to increase publication and grant awards. FT allocates incentives, albeit for small amounts. In order to become a source of income, the results of research should include applied and innovative products. To support these objectives, FT plans to create business incubation. Interestingly, FT seeks to build unity among the academic community through eating at the cafeteria as a means of sharing ideas among students and lecturers from various departments. In the cafeteria, which is free for lecturers, various interesting research ideas emerge and even become topics of inter-departmental research.

FT is also aware of the potential for doctoral students to support international publications. Therefore, it provides facilitation and coaching for doctoral students, such as writing training, coaching clinics, editing services and publication incentives. Database improvement is a concern of FT in mapping out achievements and issues, to assist in the development of appropriate strategies. In terms of human resources, FT is one faculty that has many professors. Currently, there are 51 professors in FT from a total of 211 lecturers. This is a result of standard operating ppprocedures and transparency of the career system, as well as the absence of barriers. This is to encourage campus faculties to create research and publications that can promote the progress of lecturers' careers. FT also provides a means of publication, such as holding a conference with proceedings that are indexed in Scopus, as well as Scopus-indexed journals.

In some aspects, what occurs in FT is also implemented by other faculties, such as FIB. Over the past two years, as can be seen in the interview excerpts below, FIB has tried to build a research culture among lecturers by sending lectures to participate in training on writing proposals, awarding research grants, facilitating translation of articles, holding research seminars and giving assistance for publication.

> "In the last two years, we have tried to facilitate it. We start early in the year after being assigned to be part of the research and '*pengmas*' (community service). We start from how to increase the interest in research or pengmas through lectures from professors that talk about the need for research and pengmas. Initially, we prepared some lectures from the professors. After the lectures were started, the interest was high and the most common question was 'I want to do it. So, what should I do?' Next was training on proposal writing, how to make research proposals and how to make pengmas proposals. I prepared for this one year. I did it step by step. It will be 'nicer' if they are the ones who request it. I prepared the first training on how to increase interest and how important research is, then where to apply for research. The second was how to make proposals. After making proposals, we had to predict the third. Anticipating that lecturers had made proposals but were not successful, we set up an internal grant. I don't know about other faculties, but in this faculty the amount of internal grants is actually small. So we set up the initial grants, intermediate grants and pengmas grants with an average of 10 recipients. The grants are intended for associate professors. Except perhaps for intermediate grants, it is still okay. That is, there is an opportunity to have activities in the faculty. But if the proposal is good, we encourage them to look for external grants, for example from DRPM or from the Directorate General of Dikti. When the research is finished, we always ask for a report, not a big report, but a report in journal format. Although there is a progress report, they still make a big report without it being required. Scientifically, the strategy or policy can still be accounted for because

the researcher makes a complete report. We ask for a 15 or 20 page report in an appropriate standard format for a journal. We have a policy of free translation service." (In-depth interview with the FIB Research and Community Service Manager).

FIB provides coaching in preparing grant financial statements, and gives awards to lecturers who publish their research. In the implementation process of the grant, FIB requires the involvement of students in order to provide support to lecturers in data seeking and processing, while developing students' potential. FIB provides small grants to research centres in the faculty.

Research centres at the university, faculty and department levels conduct a number of activities related to modalities. RCCC, for example, hires dedicated staff to be the 'backbone' of the research centre to deliver timely reports to grant providers. The centre recruits new PhD graduates who have just returned from abroad. RCCC also creates dedicated training for these people on how to procure funding. The in-depth interview excerpt below discusses this.

"Researchers who are PhDs returning from overseas are recruited. Because we need dedicated staff to write, to create reports, to write proposals and so on. In between that, yes we do training for them; training on how to procure funding, how to find donors, how to find existing subjects or research. The most important thing is to have networks all over the world. I said to my colleagues in the centre, "You have networks, I have networks. You all have networks". We collect the networks. Then we started with the networks. Getting funds is key. It's a very decisive factor. Therefore, as I already mentioned, everybody funds research." (In-depth interview with RCCC Director).

The RCCC has a target to publish at least five international publications each year. Through publications, a research centre will be known and become a centre of excellence. In Puskapol (centre of political studies), one of the research centres under a department, the modalities include, among others, the existence of some research that is followed up to be used in advocacy or in policies. One of them is a publicly accessible database through an Android-based mobile communication device. The managers and staff of Puskapol limit themselves to take a maximum of six credits of teaching, as explained in the following in-depth interview excerpt.

"For us, there is no need to do full teaching credits up to 18 credits. That's why we restrict ourselves. Everyone at Puskapol if possible, does six credits only. But we are commited to research-based teaching. Sometimes in that context, maybe the regime of the procedure, actually creates a mess, because everyone wants to maximise it." (In-depth interview with the Deputy Director and Research and Data Centre Manager of Puskapol).

Individual factors encourage the performance of research. In particular, there are a number of aspects to individual lecturers and researchers in UI that support the achievement of the institution's research performance: (1) research mindset; (2) networking; and (3) experience and expertise. In terms of research mindset, based on interviews with several informants, the average number of lecturers who do research in UI is 30 percent to 40 percent, while in FT, the average reaches 85 percent to 90 percent. The high percentage of lecturers who conduct research in FT cannot be separated from efforts to build a research culture carried out since 1997. These efforts are able to change the research mindset of lecturers, so they understand that research is needed to improve the quality of teaching, as well as benefiting the community. The mindset of researchers affects their efforts to meet their research obligations, as one of the elements required to advance their academic careers.

In addition to research mindsets, networking has an impact on research

performance. Networks owned by a lecturer or researcher have the potential to bring in funding for research. The availability of funds will determine how much research is performed, which will ultimately have an impact on the expertise of lecturers and researchers. According to one informant, it takes a lot of money to become a leading researcher. The more skilled and experienced the lecturers and researchers are, the higher the quality of research. In addition, the expertise and experience will determine the preparation of a research cluster road map. Expertise and experience are also required for guiding young lecturers and researches who will be the successors in an institution.

4.3. Research barriers in UI

This study looked at eight issues that create barriers to research in UI: (1) alignment; (2) research funding; (3) research agenda/priorities; (4) human resources for research and research 'career'; (5) remuneration and incentive systems for researchers; (6) credit system or kum; (7) publication schemes and research for policy; and (8) research management.

(1) Alignment

There are three key findings related to policy alignment: (1) government policies have not shown a clear research grant strategy although policies have led to an increase in university research performance; (2) research collaboration with other parties, especially the ministries/agencies (KL), are not institution-based; and (3) policies in UI are still considered inconsistent.

According to several informants in this research, government policies are already heading in the right direction, with a dedicated ministry that focuses on research. However, there is still uncertainty, such as the shifting of the directorate general or changes of institution nomenclatures. In addition, the grant strategy of government policies is not yet known to researchers, as illustrated by the following interview excerpt.

> "For us, one of the indicators is information. From the information, it is not clear which direction we are going. During this period, the focus seems to be still on fake university diplomas. Grant strategies on research are not visible. The information that reaches me, or at least the lower levels, is more towards the importance of Scopus. There must be an international journal, things like that. This is legitimate so that we can speak more globally, but from my personal view, from what I see, policy should be aimed more internally. There are still many domestic affairs that must be resolved without having to focus on having a 'cool' name abroad." (In-depth interview with FIB Research and Community Service Manager).

The vagueness of government policies can be seen from the number of individual grants compared to cluster-based grants. In addition, the design of research results for the application of innovations remains unclear, despite existing directives and the fact that the Government's innovation directorate only follows what is already available in universities. According to one informant, this can also be seen from the lack of details related to government strategies that are assigned to UI. UI is given a target to be a world-class university but there are no strategies on how to achieve that and no adequate funding is provided[4].

Another barrier is the current budget system that makes it difficult for research institutions to cooperate institutionally compared to individually. As a result, according to one informant, certain institutions such as ministries or agencies prefer to work with research institutions through an individual-based mechanism, such as a consultant, expert or expert staff. Thus, there is no institutional capacity building. In such a collaboration model, the

4 In-depth interview with the Vice Rector for Research and Innovation and his staff member.

lecturer who serves as a consultant, expert or expert staff generally does not own the copyright on his or her work. The research results cannot automatically be published by the lecturer for the purpose of academic publication at national and international levels.

This condition is a result of the inability of the research institute to participate in the bidding process, as it does not meet certain requirements. The description from the informant is in line with the personal experience of the authors who have been involved in research in ministries and agencies as individuals. In order to strengthen the capacity of research institutions in universities, institutional collaboration between research institutions and ministries and agencies needs to be developed. Thus, the benefits can be felt on both sides. Ministries and agencies will benefit from the results of quality research to be used in policy making, and research institutes in universities can increase their capacity.

Barriers in terms of alignment also exist in the internal policies of UI. Some informants said there were a number of policies in UI that were unclear, do not align, or were inconsistent. One such inconsistency relates to the DRPM Gazette. Previously, DRPM had a media outlet called the DRPM Gazette. This helped researchers in UI, however it no longer exists and was replaced by the simpler DRPM News. This is a small example of inconsistency in UI.

(2) Research funding

There are four main findings related to research funding: (1) the approach to research grants that requires a grant to be totally used; (2) difficult financial reporting and fund disbursement; (3) government budget allocation for research funding is still small; and (4) lack of funding from the private sector. Analysis of the findings from the field concluded that all four findings became barriers to research performance in UI.

Regarding research funding, almost all informants stated that currently there is relatively a lot of funding provided through various research grant schemes. However, according to several informants, the use of research funding still emphasises 100 percent budget spending and does not focus on the usefulness of the research results. The reason is that there are still many individual-based research grants that meet the lecturers' required credits, rather than cluster-based or multi-disciplinary-based research grants; this is actually the research that tends to contribute to the development of science or practical interest. Another problem is that research outputs have not met expectations yet. Based on interviews with informants, many research grants disbursed do not produce research outputs as planned, especially in terms of the time for research. Only about 20 percent of research is classified as providing timely outputs, with the rest completed after the deadline, even without expected outputs.

According to several informants, complicated financial reporting and disbursement processes contribute to research not being completed on time. The current system does not allow for a multi-year research budget and requires researchers to write a report by the end of the fiscal year. In reality, it takes a long time to publish research results in international scientific journals. This is compounded by the starting time of the research being delayed due to delayed disbursement processes. To address this, researchers often have to use their own money before a grant is disbursed. Alternatively, collaborating with banks to take loans has already been proposed by lecturers/researchers/research managers. Until now this proposal has not been accepted. Funding problems are exacerbated by a financial accountability system that requires researchers to deal with complicated financial statements that

are bigger than the research report itself. The obligation to report financial proof often does not consider the field conditions where research is performed. For example, researchers are required to attach proof of payment for food, whereas the food stalls visited are often street vendors who do not provide receipts. Various requirements are suspected to be among the reasons that many lecturers still do not do research.

The complicated financial reporting and fund disbursement systems currently attract attention from the Government. The Government is trying to simplify the financial statements for research through output-based research funding mechanisms. The target of this policy is to give flexibility to researchers regarding the use of funds, to create simple financial accountability, and to enable multi-year research budgets. In simplifying research financial statements, the Government needs to look at the existing conditions in UI. Data show that only about 20 percent of research produces timely outputs. This is the result of a too-rigid research funding system. Such conditions are highly likely to occur elsewhere, therefore it is crucial to have a mechanism to ensure appropriate expected research outputs. The key to addressing this problem is to allow multi-year research to be conducted to produce a given output, particularly in the form of publications in international journals, which require time. Thus, researchers would be supported to publish their research results adequately.

Another issue is that research funding in Indonesia, including in universities such as UI, it is still far from adequate when compared to GDP. This is recognised by the Government in view of the fact that the research fund provided is only 0.09 percent of GDP. The Government is trying to increase it to 0.5 percent of GDP[5]. Inadequate research funding will affect the quantity and quality of research. Limited research funding is also due to the fact that almost all sources of funding come from the government budget, while the contribution of the private sector is low. Some informants revealed a lack of private sector involvement in supporting research in universities, for example in funding the construction of a research laboratory or providing laboratory equipment. According to one informant, almost all over the world, the private sector contributes to building campus laboratories where the results of research in the laboratory can be used by the private sector.

(3) Research agenda/priorities

From the perspective of research agenda/priorities, there are six key findings that influence research performance: (1) the national research policy agenda is still considered unclear; (2) unclear road map of universities and research centres; (3) UI research centres have not yet supported the Strategic Plan; (4) research has not been integrated with user needs; (5) research focus tends to be extreme and in areas that are difficult to reach; and (6) complicated requirements of research.

Determining the research agenda is an important factor in making sure the research is done according to requirements, so it can be used by society and can help solve the nation's existing problems. The research agenda of a higher education institution should be in line with the national research agenda. The national research policy agenda is still considered unclear, or not properly disseminated. This problem is apparent from, for example, the national research agenda, which is often not used as the benchmark for universities. This national agenda has never been discussed in knowledge-sharing sessions organised by KSI.

The research agenda issue is also faced by the UI, for example in determining the research road map. UI has consistently prepared a road map that includes the

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research agenda despite the road map going through several changes. The changes indicate a problem in defining the road map. According to one informant, road maps are often made without any prior evaluation of various existing conditions in UI. To address this, the latest UI road map was prepared based on the results of an evaluation of existing field conditions. In addition, it appears that a number of research centres do not have a road map, or have an unclear one, which affects the performance of the research centre. According to one informant, the lack of clear research road maps leads to low performance of research centres in generating continuous and quality research. The issue of road maps will in turn lead to non-alignment between research centres' agendas and activities and the UI strategic plan. Currently, there are still research centres that work on their own and do not support programs in UI's strategic plan. The other problem is that the existing research agenda does not align with the needs of users, especially the private sector. A research agenda should align with the interests of users so it can be utilised, besides of course trying to find alternative funding sources. In reality, this still cannot be achieved, including at UI.

Another finding is that there is a research centre in UI that focuses on 'extreme' studies and research in remote areas. This makes it difficult to find funding sponsors. The Papua Center experienced this, as stated in the following interview excerpt.

> "We find it quite difficult to find research funds for Papua, due to restricted and extreme themes, and as options are related to advocacy. All the themes that are developed in Papua are extreme. There is a sense that many are interested, but it is remote [less understood] and it is not easy to enter Papua. We are considered a minority there. We also do not know anybody and outsiders have certain views about us. Unless we are pastors or religious leaders–they are seen as clear leadership positions. But researchers are considered foreigners who enter the area and they feel that they are different–'It's you against me'. More or less like that." (In-depth interview with the Director of the Papua Center).

Another constraint is that grants are considered burdensome, so lecturers and researchers do not want to compete for them. This can be seen in the data in Table 5, where there are at least six types of grants that could be pursued by a lecturer or researcher: (1) multi-disciplinary research grant; (2) initial research grant; (3) cluster research grant; (4) post-graduate research grant; (5) national collaborative research grant; and (6) international collaborative research grant. To be eligible for the grant competition, there are a number of requirements including, among others, the status of permanent lecturer with certain minimum education (initial research grant: master degree, multi-disciplinary research, cluster, post-graduate; and collaboration grants: doctorate degree). One informant described these requirements as burdensome. Researchers who do not meet the requirements cannot compete for grants. At UI, there are research centres where researchers do not have permanent lecturer status and only have a bachelor's degree.

(4) Human resources for research and research 'career'

This study identifies seven key findings regarding human resources/researchers/career path: (1) stagnant recruitment of lecturers; (2) unclear employment status of researchers; (3) lack of non-technical skills (soft skills) among lecturers to seek funding; (4) lack of knowledge on citation; (5) under-developed research culture; (6) assignment of team that is not associated with research agenda; and (7) unclear rules on students' involvement in research.

Stagnant recruitment of lecturers widens the lecturer-student ratio. The gap in lecturer-student ratio relates to the policy of the university to increase revenue, which tends to increase the number of students. As a result, a lecturer is burdened with a lot of teaching assignments and is left with limited time for research. To address this problem, the Government has issued a policy on special lecturer identification (NIDK), which is an identification number issued by the ministry for contract-based lecturers working in universities, whose salary is paid by the university as stipulated in the Regulation of the Minister of Research, Technology and Higher Education No. 26 of 2015 on registration of university lecturers. Under these provisions, lecturers who are researchers, practitioners or retired lecturers may have an NIDK and are included in the calculation of the lecturer-student ratio. This government policy is a major breakthrough, which is in line with Law No. 5 of 2014 on State Civil Apparatus, particularly regarding government employees under employment contracts. This policy, according to the opinion of the authors, will be able to reduce the workload of permanent lecturers so that they have more time to do research. However, its implementation depends on the financial capacity of the university. Stagnant recruitment occurring in UI, in the authors' opinion, is caused by, among others, financial constraints experienced by UI, especially for paying employees that the university recruits independently. As for the recruitment of lecturers with civil servant status, the number is determined by the Government.

In terms of employment status, most researchers are lecturers with double burdens. According to several informants, recruitment of human resources devoted to research work is needed to encourage research. Unfortunately, the idea has not materialised, particularly in the FT and FIB, which are the locus of this research. A different situation is seen in the Faculty of Medicine and several other research centres that have a mechanism to recruit researchers independently, although there is no clear policy at the national and UI levels on this mechanism. Consequently, there is no certainty about the status of researchers who have been recruited due to the lack of clear regulation in UI. The vagueness of this arrangement will affect researchers' performance. According to several informants, most researchers use their time to look for advanced scholarship.

One of the barriers is that lecturers as researchers do not have the soft skills or the non-technical ability to seek funds and knowledge about citations and 'sabbatical leave'. An informant said that to become a leading researcher, a lecturer should do many high-quality research activities. To do this, the ability to raise funds from various sources to support research is important. Unfortunately, according to the informant, lecturers often do not have that ability. In addition, lecturers also do not have adequate knowledge regarding citations and sabbatical leave. In reality, to create a quality publication, lecturers should understand how to make citations. Sabbatical leave is needed to be able to write for publication, undisturbed by other work. The following interview excerpt illustrates the ignorance of lecturers regarding citations and sabbatical leave.

> "Currently, it seems that the majority of scholars in Indonesia, in this case those with master's and doctorate degrees, do not know what a citation index is. Nor do they know what sabbatical leave is, as it does not exist in the regulation. In fact, when referring to good management of state universities applied by international institutions, there should be a period during research where researchers are relieved from other functions for a while." (In-depth interview with a FISIP researcher).

Research culture also affects the achievement of research performance in UI. Currently, only about 30 percent to 40

percent of UI lecturers do research–except in certain faculties such as FT where the percentage is much greater. Low interest of lecturers in research is due to an under-developed research culture and high teaching burdens. Still, there are lecturers who do not understand that their job is not only to teach, but also to do research. There are also lecturers who believe that research is a troublesome job.

Lecturer assignment is not linked to the research agenda. Assignment of lecturers in teaching should be aligned with the research agenda so that lecturers needed in featured research have their teaching load reduced. According to one informant, the existing rules do not expressly regulate the amount of credit for teaching. Although the minimum and maximum credits have been set out, there is no strict division between aspects of the Tri Dharma. In UI, this unclear division causes, among other things, inadequate lecturer-student ratios. Another cause is the lack of integration of coordination between research fields and other fields, such as human resources and finance. In addition, the contribution of bachelor and doctorate students, who are potential resources to support research performance, has not yet been optimised. Lack of attention to UI students' potential is evident from the lack of clear rules regarding student involvement in lecturers' research. As a result, it is possible that students are 'exploited' by lecturers who involve them in research.

(5) Researcher remuneration and incentive system

The study on a remuneration and incentive system concluded the following: (1) the current remuneration system is no longer effective; (2) incentives for researchers are insufficient; and (3) research centres must fund their own activities, adding a burden to the centre.

To encourage the growth of quality research, UI implements a lecturer assignment scheme using the following categories: (1) lecturers who focus on research (research core lecturers); (2) lecturers who focus on teaching (teaching core lecturer); (3) lecturers under the structural scheme; and (4) lecturers under other schemes. Specifically for research core lecturers, a policy is applied which limits the number of credits or teaching load and provides greater incentives with a target of publishing a certain number of research publications. This system is not considered effective, especially in faculties with high-performing research such as FT. This system is deemed unfair, as only a handful of lecturers could become research core lecturers. A new system is currently being developed based on performance in teaching, research and community service. The provision of additional incentives for lecturers is seen as an important factor to encourage lecturers to do research and to produce research that benefits society. Both UI and the faculties have a number of incentive programs for lecturers who are able to publish their work. However, budget constraints have caused such incentives to be less than optimum.

A shortage or lack of funds for research centres is a constant problem. The result of this research regarding the availability of budget for research centres shows that the majority of research centres do not receive funding from the university or faculty. Even if funding is available, the amount is very limited.

(6) Credit system or kum

Analysis of the aspect of credit system (kum) for lecturer promotion reveals two major findings: (1) no promotion due to non-compliance; and (2) lecturer's research cannot be done independently. There is now awareness among lecturers to do research in order to qualify for a promotion. A number of informants said that there are many lecturers whose career has stalled because they do not do research. The reason is that they are

busy teaching as a result of inadequate lecture-student ratios and an under-developed research culture, as previously mentioned. Due to teaching burdens, many lecturers do research using support from, or even depending on, students or assistants. This requires attention, as the rules regarding student involvement in a lecturer's research are unclear.

(7) Publication scheme and research for policy

This research found four aspects related to publication schemes and the link between research and policy: (1) reduced number of publications because the lecturer has a structural position; (2) research that is done to order and cannot be published; (3) research that cannot be completed within one year; and (4) lack of scientific publications in Scopus-indexed journals or other rating agencies such as Thompson Reuters.

In terms of reduced number of publications, this research found a faculty where the number of scientific publications had decreased, as many of the lecturers held structural positions. This needs to be addressed, as UI has high publication targets. Existing resources must be able to meet the targets.

The decline is also due to the fact that research centres work on projects requested by ministries and agencies that do not require publication of research results. This needs to be addressed. It is necessary for the research centres to look for funds, which can be done through, among others, working on projects. On the other hand, most projects do not require publication. Therefore, it is necessary to encourage publication of the results of these types of projects if possible, and with the approval of the respective ministries and agencies.

Another barrier is that scientific publication in international journals as outputs of research is not done in a timely manner. This is due to the complicated financial reporting system that creates difficulties for researchers, as previously described. Publication in international journals also requires a dedicated journal. Currently, UI only has one Scopus-indexed journal. To address this, UI is working with various international journals with a view to having them indexed in Scopus. This includes inviting the manager of Elsevier to explain the rules about how a journal is indexed in Scopus. In the opinion of the authors, it is very difficult to be indexed in Scopus for several reasons, including the inability to publish a journal on time.

(8) Research management

There are seven main findings related to research management: (1) it is difficult to achieve the target of researching and publishing within one year; (2) databases are weak; (3) research equipment is inadequate; (4) monitoring and evaluation are problematic; (5) ethical standards are not well established; (6) weak project management ability among lecturers; and (7) research centres are not able to work together to seek funding. Difficulties meeting the target for publication are due to the financial reporting system, as previously described. To reduce duplication of research, a database that links the universities with the Ministry of Research, Technology and Higher Education is needed. Although UI has a research data information system, its management is not optimal, especially in terms of data updates, including updates on collaboration-related data.

UI research equipment is out of date and finding funding to provide adequate equipment is difficult. Although UI already has an Integrated Laboratory and Research Centre, many laboratories are not equipped with adequate and necessary equipment. There are also issues with the monitoring and evaluation of the output of research funded through grants. Based on the data, only about 20 percent of research produces outputs in a timely manner in the form of publication in international journals. Another problem is that

there are no standardised research ethics.

Weak research management cannot be separated from the issue of lecturers' double burden. According to one informant, due to the research project management problem, researchers are unable to submit reports in a timely manner. This situation greatly affects the credibility of research centres in the eyes of donors. In addition, no collaboration between research centres is established yet, leading to each research centre seeking its own funding. This will add to lecturer's burdens. There are fewer opportunities to obtain research funding, as many donors are more interested in multi-disciplinary research.

4.4. Good practices by universities and researchers to address research barriers

Although hindered by a number of barriers in research implementation, there are many good practices conducted by UI, faculties, research centres and researchers that address barriers to research. These include:

- UI provides many research grants notwithstanding funding constraints. Based on the data, currently there are at least 21 types of grants and other assistance available to fund research activities and community service. This demonstrates UI's commitment to research.
- UI focuses on the innovative application of research results. UI has a Directorate of Business Incubation, which is structurally under the coordination of the Vice Rector for Research and Innovation, who is responsible to DRPM and the Directorate of Information Systems and Technology. Institutional arrangements such as this show UI's commitment to research and its benefits to society.
- To address barriers and difficulties in research financial reporting, a number of faculties have started to do coaching on the preparation of financial reports.
- UI seeks to establish mutually beneficial cooperation with the private sector to fund research equipment, as evidenced by the cooperation between Olympus and UI through the UI Olympus Bio Imaging Centre. Through this cooperation UI gets support in the form of equipment, such as laser scanning microscopes and inverted fluorescent/phase contrast microscopes.
- UI has been developing research road maps for some time. The road map currently developed is the result of an evaluation of various real conditions in UI.
- Some research centres and faculties, such as the Faculty of Medicine, already have an internal mechanism to recruit researchers who work specifically as researchers.
- Research centres such as RCCC regularly provide training to researchers on building networks. These networks allow them to obtain necessary research funds.
- Some faculties, such as FT, have long been attempting to build a research culture. Other faculties, such as FIB, have begun thinking about building a culture of research in accordance with directives from MWA.
- To integrate research, teaching and community service activities in UI, a performance-based remuneration system is currently being drafted.
- UI and faculties routinely provide incentives for lecturers who are able to publish their work in international journals.
- Some faculties, such as FT and FIB, provide financial assistance to research centres even though the amount is still limited.
- Research centres such as RCCC have an obligation to publish in international publications every year.
- UI facilitates journal management according to accreditation standards. This is to comply with national standards and is moving towards meeting international

standards to have the journals indexed in Scopus. UI has invited a manager from Elsevier to explain the requirements for journals to be indexed in Scopus.
- Faculties such as FT hold conferences that result in proceedings with Scopus-indexed rankings.
- UI is trying to build a database of research results that can be used to monitor success. Faculties such as the Faculty of Medicine are also trying to build an adequate research database.

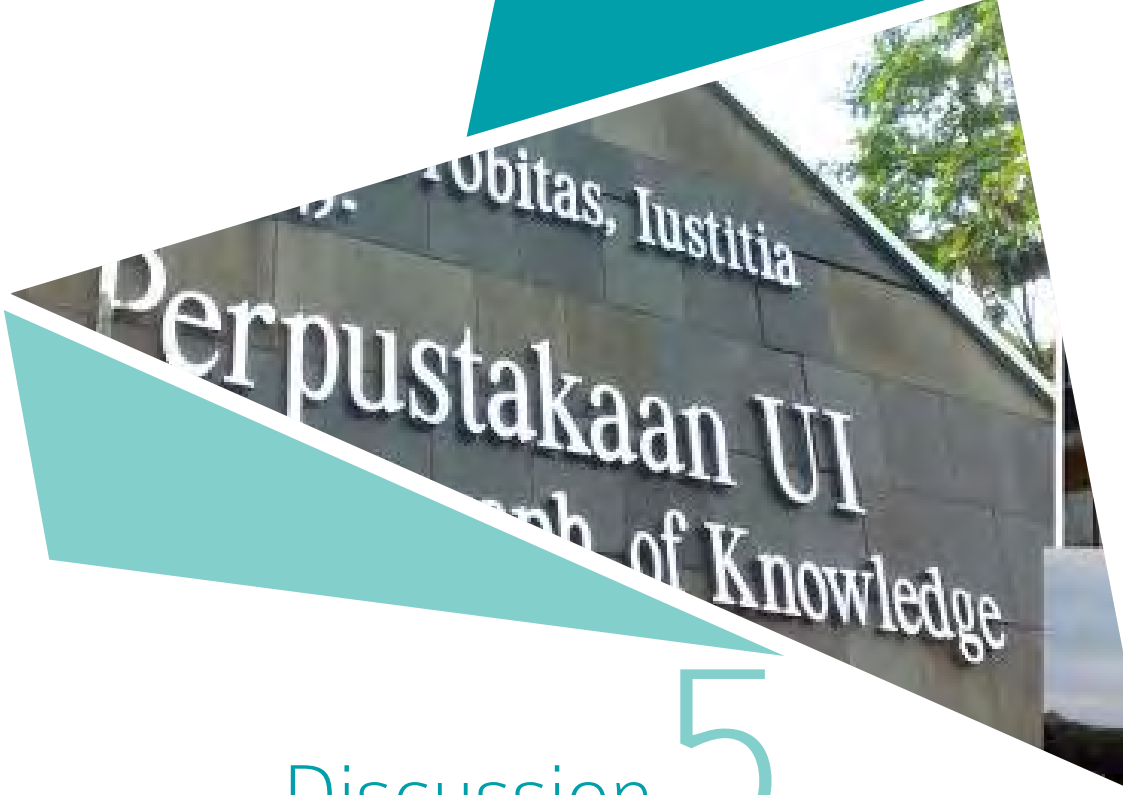
4.5. University and researchers' expectations and opportunities for improving research in UI

Barriers to research and good practices in research management in UI have generated expectations among the academic community to improve research performance, as revealed in interviews with informants. These expectations include:

- Kemenristekdikti should not only give UI targets, but also provide adequate funding to achieve them. Based on several world-class university rankings, UI currently ranks highest among universities in Indonesia, even though the QS ranking of UI decreased over previous years. Therefore, it is necessary to have affirmative policies of Kemenristekdikti so that UI can boost its rank in future years. One of the affirmative policies is the allocation of adequate research funds.
- The target of Kemenristekdikti to increase the world ranking must have a clear focus and strategy, including the determination of universities assigned, and funding. Kemenristekdikti must give the assigned universities special treatment.
- Kemenristekdikti has categorised universities for the purpose of coaching. There is a need for these groups to be treated differently, including for fund allocation and the mechanism of fund utilisation.
- Government investment in research equipment is needed for research, in particular in the science and technology fields. Thus, research performed by universities will be able meet the needs of users. Users, such as industries, will not need to create their own research and development unit but rather use existing facilities in universities such as UI. It is possible to open up opportunities for industries that want to invest in equipment to be placed in universities. This would address the issue of obsolete research equipment.
- Regarding equipment investment by the Government, it is expected that the mechanism of procurement is transparent without the need to lobby other parties such as members of the House of Representatives (Parliament).
- There should be research strategy designs at the national level that are not based on individual research but on clusters, so that the outputs of research are innovations that can be used by the people. This design should be used as a reference for ministries/agencies and universities.
- Policies to increase resources, both financial and infrastructure, should be directed towards developing a culture of research and publication of scientific papers that link teaching, community service and research. For example, there are already policies that regulate lecturers' workload during a semester. However, there is no clear division between teaching, community service and research activities.
- Improvement of grant management and the accountability mechanism is needed to create a mechanism that is simpler and can accommodate multi-year research. In addition, there is a need to commit to increasing the percentage of research funding compared to GDP.
- It is necessary to build a database of research results that is integrated and

connected between universities, Kemenristekdikti and other ministries/agencies. The database will be the source of important information about the results of research in order to reduce duplication and to provide benefits for related parties.

- There is a need for systematic efforts to improve Indonesia's journals with a view to having them indexed in Scopus, in particular for the fields of social science and humanities.



5 Discussion

A number of researchers, including Sarunya Lertputtarak (2008) and Maarja Beerkens (2013) have conducted studies on barriers to research in universities. Lertputtarak, in his study, examined the factors that affect the productivity of research in state universities in Thailand. He raises four factors:

1. Demographics, involving individual characteristics such as age, sex and marital status of lecturers.
2. Environment, involving colleagues and mentorship.
3. Institution, involving the institutional form of the university.
4. Individual career development, involving the ability, interests and behaviours in conducting research, the origin of the academicians, degree held, research experience, expertise and training, as well as rank and employment status.

Lertputtarak shows that research productivity is influenced by a number of aspects, including: (1) self-motivated researchers; (2) university background as a teaching-based university; (3) high teaching workload; (4) inadequate salary; (5) research facilities; (6) financial policy to be followed by the researchers; (7) inadequate research funding; and (8) researchers who are older. Meanwhile, in a study to test the impact of Australian university management on the productivity of academic research, Beerkens presented three management practices:

1. Practices at the faculty and school levels, i.e. performance monitoring and performance-based funding.

2. Practices at the institutional level, i.e. benchmarking with other institutions, as well as the concentration/focus of research.
3. Practices at the individual level, i.e. increase in research qualification, structural support and incentives for individual research.

The results of the Beerkens study show that management practices seem to have a positive impact on research productivity. Universities with more intensive management approaches have a higher level of research productivity, and the productivity of research is growing rapidly. Some major findings resulted from the research by Beerkens and Lertputtarak. Judging from the current research performance, UI is still the best university in Indonesia. The current research performance could potentially be improved to match some universities in neighbouring countries that have better research performance.

There are a number of driving factors that influence research performance in UI in terms of structural, modality and individual factors. Structurally, it is known that policies made by the Government will determine UI's research performance. Through government policy that assigns UI as BHMN/PTN-BH, UI has more authority in academic administration and financial management activities. This authority is used to perform a variety of institutional adjustments to encourage better performance. Other government policies that determine performance are the allocation of funds, regulation on credit points, and publication by students, all of which UI complies with. Thus, it is considered that affirmative policies are needed to improve research performance in universities. The Government needs to create policies that support the achievement of targets assigned to universities, including UI. The findings of this study differ from those of Lertputtarak and Beerkens. This research looks directly into government policies, while Lertputtarak and Beerkens did not.

The next research performance driver is the modality factor–institutional support. This research found that internal policies of an institution that are driven by the vision of stakeholders, especially leadership, largely determine the research performance of the university. The vision of the key stakeholders will determine the consistency of policies, which is one of the important aspects of research performance. Another important aspect is a breakthrough made by the university, faculties and research centres. A breakthrough promotes a culture of research and is conducted by providing the facilities needed for research. Breakthroughs may be made if key stakeholders understand various conditions. The findings in research culture and facilitation, for example, are in line with those of Lertputtarak, particularly those related to motivational factors, teaching workload, salaries and research facilities. It is also similar to Beerkens's findings, particularly in relation to structural supports.

The last driving factor is the aspect of individual researchers, the mindset of research, owned networks, and experience and expertise. Some of these aspects are crucial to improving research performance. This finding is consistent with the findings of Lertputtarak, especially with regard to the motivation factor and age, and with the findings of Beerkens, in particular the aspect of research qualifications.

There are a number of obstacles to improving research performance, including the alignment of policies; research funding; research agenda/priorities; human resources/ researchers/career path; remuneration and incentive systems; credit system (kum); the publication scheme and its link between research and policy; and research management. The alignment barrier takes the form of government policies that appear not to give exact directions, despite the direction being positive; research collaborations with other parties, particularly ministries and agencies that are not institution-based; and policies at UI level that are still considered unclear. This ambiguity shows the

inconsistency of policies made by the Government and UI.

Barriers to research funding are due to the distribution of research grants through a budget approach that requires total utilisation of funds; financial reporting and disbursement of funds that are difficult for researchers; limited research fund allocation in the state budget; and a lack of funding from the private sector. These barriers show a need for attention and commitment from the Government to explore potential funding sources.

In terms of research agenda/priorities, one barrier is that the national research agenda policy is considered unclear; the research road maps of the university and research centres are still vague; UI research centres do not yet support the strategic plan; research has not been integrated with users' needs; research focus tends to be extreme and in difficult-to-reach areas; and research grant requirements create burdens. Stakeholders need to determine research priorities according to need, and disseminate them to those who need them.

Regarding human resources/researchers/career path, barriers include stagnant recruitment of lecturers; unclear employment status of researchers; lack of non-technical abilities (soft skills) of lecturers to raise funds; lack of knowledge on citations; under-developed research culture; team assignments that are not associated with research agendas; and unclear rules on student involvement. To address these, government and universities should make policies based on real conditions in the field.

In terms of remuneration and incentive systems, the problem is that the current remuneration system is ineffective; incentives are not sufficient; and research centres must fund their own research. Thus, systems are needed to encourage a balanced implementation of teaching, research and community service activities. Government commitment is needed to provide funding to gain research results that are beneficial for the people.

In terms of the credit system (kum), the barrier is that a lecturer's career stalls due to inability to comply. Another barrier is that research has to be conducted jointly with others. This condition requires attention from governments and institutions in order to develop ways to foster interest among lecturers to conduct research and publish scientific works. In addition, rules on research ethics are needed to ensure research stays in the corridor of scientific research.

In the case of publication schemes and the link between research and policy, the bottleneck is the reduction in the number of scientific publications of lecturers who hold structural positions at university, faculty and department levels; research requested as external projects does not require publication; research output that is not completed within one year; and the lack of Scopus-indexed journals. These problems are due to human resources, a lack of rules that facilitate research, and policies that are not integrated with one another. To improve performance, policies should cover all aspects, from upstream to downstream.

Issues in research management include difficulties meeting the target of research publication in one year; database problems; lack of research equipment; lax evaluation and monitoring; unclear ethical standards; social and humanities research that requires field work; poor management of projects by the lecturer; and the inability of research centres to jointly seek funding. Government attention is needed for equipment and to build an integrated research database. Research policies need to align with different scientific fields. In addition, the capability of lecturers and researchers should be improved.

Various findings related to barriers to research in UI are in line with and support the findings of Beerkens and Lertputtarak. Lertputtarak revealed a number of factors that affect the productivity of research in state

universities in Thailand. Based on this study, these factors are also present in Indonesia, especially in UI. Beerkens tried to see aspects of university management and its impact on research productivity. Beerkens's findings are also cited in this research, such as performance monitoring, benchmarking, research focus, increased research qualification and structural supports.

At the beginning of this study, it was proposed that the university did not pay significant attention to certain aspects of research, and paid less attention than it did to Tri Dharma perguruan tinggi (teaching, learning and community service). The results of this research indicate that UI does pay attention to research, but there are a number of barriers that need to be addressed in order to increase its research performance.

Attention should be given to how the Government and UI can take steps to address these barriers. Inconsistency issues need to be addressed. As the Government wants UI to be a world-class university, it should support this target with policies. The Government should remember that the essence of research is to support the country's economic growth. Research must produce outputs that can help address problems faced by the nation and the state of Indonesia so it can compete with other countries. Although UI is directed towards being a world-class university, the research results should still be able to provide benefits to the community.

6 Conclusions and Recommendations

6.1. Conclusions

Based on the above discussion a number of conclusions can be drawn. First, the overall research performance of UI is still the best in Indonesia and has the potential to increase. Second, the driving factors for research performance in UI include structural factors, modality and individual factors. Structurally, the policies made by the Government determine UI's research performance. Modality factors involve institutional support in the form of UI's own policies. The individual factors link to the research mindset, owned networks, and the experience and expertise of individual researchers. Third, there are a number of barriers to improving research performance, including policy alignment; research funding; research agenda/priorities; human resources/ researchers/career path; remuneration and incentive systems; credit system (kum); publication schemes; the link between research and policy; and research management. There are a number of good practices of UI, faculties, research centres and individual researchers in addressing these barriers.

6.2. Recommendations

From the findings above, there are a number of recommendations proposed to Kemenristekdikti and University of Indonesia :

- Increase the number of cluster-based research grants, as this will create impacts on scientific development and strengthen the institution's research capacity.
- Encourage research where the results not only demonstrate scientific development, but also benefit society.

- Create a collaboration agreement between the Kemenristekdikti and other ministries and agencies as an umbrella for cooperation between universities and ministries/agencies. This will enable research results to align with the Government's needs.
- Increase the number of lecturers and researchers to improve the lecturer-student ratio. Higher teaching workloads restrict lecturers' opportunities to do research.
- Create a collaborative agreement between Kemenristekdikti and the private sector as an umbrella for cooperation between universities and the private sector in research infrastructure provision and revenue beyond tuition. This cooperation is based on the spirit of mutual benefit, namely the private sector contributes to the improvement of the quality of university research, while universities, with the help of the private sector, produce quality research that can be used by private parties.
- Encourage greater research budget allocation. The Government should view budget allocation as an investment for the development of science, generating research that benefits society.
- Encourage a simplification of accountability reporting for research. This does not mean that research activities override financial accountability, but that the approach is changed, from a budget spending approach to a research output approach.
- Encourage training for lecturers and researchers, providing them with expertise to build a network of cooperation and to seek research funding from various sources.
- Allocate funds for certain research missions. There are many problems in the community that need special attention, for example, research in the Papua area requires a large investment and technology development that is not profit-oriented but rather meets people's needs.
- Relax grant requirements so as to increase opportunities for lecturers/researchers.
- Encourage universities to synergise with research centres in their environment.
- Integrate research with the needs of users by using existing research facilities in universities. This integration does not only benefit the university, but also those who use the research.
- Create firmer regulations on the tasks of lecturers that include all components of Tri Dharma perguruan tinggi and pay attention to the predetermined research agenda.
- Build a culture of research in universities. Research incentives play an important role in encouraging lecturers to increase their research performance. It is important to build a culture and academic environment that supports lecturers to do research.
- Encourage student involvement in lecturers' research. The great potential of students doing minor-thesis, theses and dissertations can be optimised to improve the scientific publications of students and lecturers. Universities can also become a means for selecting new personnel who are qualified and want to work in the academic field.
- Promote the establishment of a remuneration system that includes all components of Tri Dharma perguruan tinggi and pays attention to the predetermined research agenda. Incentives that focus on teaching activities do not motivate lecturers to improve their research performance.
- Increase incentives for international publication in reputable journals, according to financial capability.
- Encourage training for lecturers to prepare scientific publications at international level. Many of the results of quality research are not reported due to the inability of lecturers and researchers to write good quality journal articles or books.Encourage universities to work together in research with ministries and agencies to produce

publications that can support lecturers' promotion.

- Encourage multi-year budgeting for research and strengthen the monitoring and evaluation of publication of research results.
- Encourage the facilitation of journal development to increase the number of nationally and internationally accredited journals.
- Build a database of research results that is integrated between universities, research institutions at ministries and agencies, and Kemenristekdikti to prevent duplication of research and to encourage the use of research results to benefit various institutions.
- Encourage transparent and integrated investment in research equipment that is required by universities.
- Promote the development of ethical standards for research in universities.
- Encourage the formulation of clear research road maps that are interconnected between the Kemenristekdikti, other ministries and agencies, and universities.

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