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Diagnostic Study

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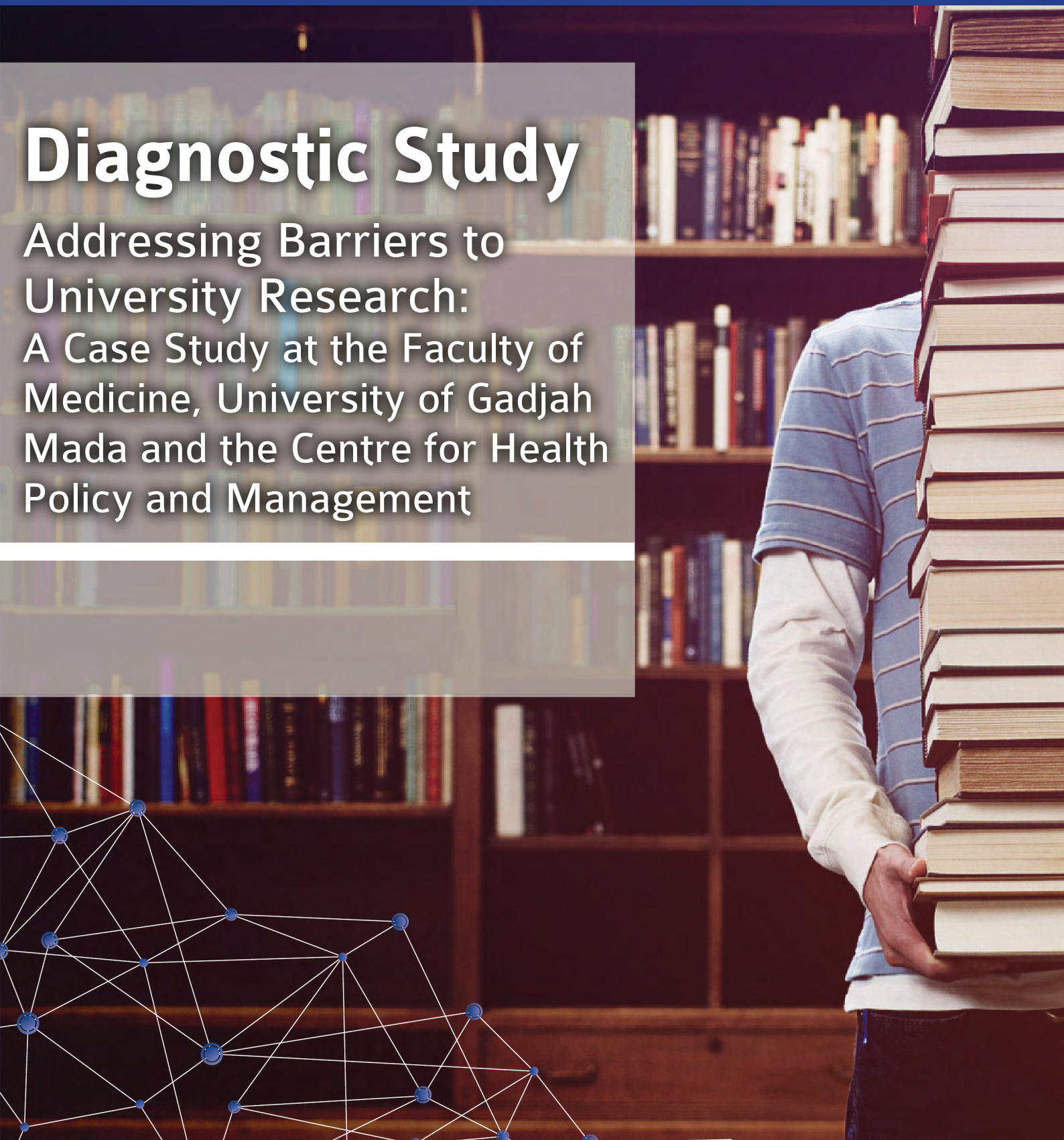
A Case Study at the Faculty of Medicine, University of Gadjah Mada and the Centre for Health Policy and Management



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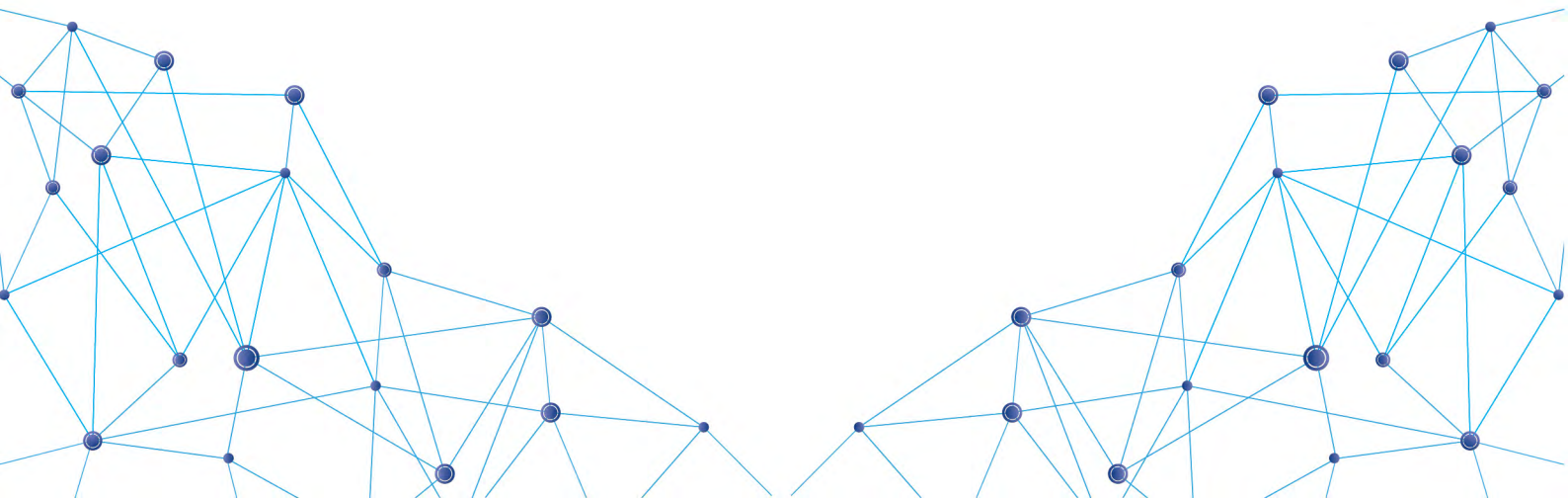
Addressing Barriers to University Research: A Case Study at the Faculty of Medicine, University of Gadjah Mada and the Centre for Health Policy and Management

By:

Ari Probandari
Lucia Evi

April 2017



Addressing Barriers to University Research: A Case Study at the Faculty of Medicine, University of Gadjah Mada and the Centre for Health Policy and Management

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Abbreviations and Acronyms

FK UGM	:	Fakultas Kedokteran Universitas Gadjah Mada (Faculty of Medicine at the University of Gadjah Mada)
Kemenristekdikti	:	Kementerian Riset Teknologi dan Pendidikan Tinggi (Ministry of Research, Technology and Higher Education)
KSI	:	Knowledge Sector Initiative
LPPM	:	Lembaga Penelitian dan Pengabdian Masyarakat (Institute for Research and Community Services)
MTA	:	Material Transfer Agreement
NIDK	:	Nomor Induk Dosen Khusus (Special Lecturer Number)
NIDN	:	Nomor Induk Dosen Nasional (National Lecturer Number)
OJS	:	Open Journal System
PKMK	:	Pusat Kebijakan dan Manajemen Kesehatan (Centre for Health Policy and Management)
Prisma	:	Portal Riset dan Pengabdian Masyarakat (Portal for Research and Community Services)
PT	:	Perguruan Tinggi (Higher Education)
PTN-BH	:	Perguruan Tinggi Negeri Berbadan Hukum (Legal Entity State University)
SDM	:	Sumber Daya Manusia (Human Resources)
SSCI	:	Social Sciences Citation Index
USPTO	:	United States Patent and Trademark Office
WIPO	:	World Intellectual Property Organization

Foreword

When we think about patents and publications, three key words come to mind: research, innovation and universities. These are the factors that determine patent issuance and publications.

Improving research and innovation in Indonesia, in terms of patents and publications, remains a challenge. The rate of patent applications by Indonesians is below Malaysia, Thailand and India.

The number of studies published in Indonesia is also small, and there has been no significant increase for years.

This discouraging number of patents and publications indirectly reflects poor performance by universities as the frontline of research and innovation. It shows that efforts to improve research and innovation in Indonesia cannot be separated from efforts to build the capacity of Indonesia's universities to conduct research and develop innovation.

Fakultas Kedokteran Universitas Gadjah Mada (FK UGM) has committed to contributing towards the intensification of efforts to improve research and innovations at universities. To this end, FK UGM seeks to actively engage in studies and other activities that will build its research and innovation capacity.

One of the strategic activities implemented is a diagnostic study on barriers to research. The diagnostic study was conducted by Universitas Gadjah Mada in collaboration with the Knowledge Sector Initiative (KSI).

This study involved several institutes, one of which was the Universitas Gadjah Mada. It was conducted mainly by Pusat Kebijakan dan Manajemen Kesehatan (PKMK) in FK UGM .

The study clearly identified various barriers encountered in the Universitas Gadjah Mada, particularly in the FK UGM PKMK, at the levels of the study centre, the faculty and the university. The research team provided several recommendations for future improvement.

While the study considered cases at the FK UGM PKMK, many of the findings and recommendations are relevant to university research stakeholders across Indonesia. We have high hopes that the findings and recommendations presented in this report will contribute to efforts to improve university research and innovation performance in Indonesia.

We thank everyone who has contributed to the study and this report.

Director, Centre for Health Policy and Management
Faculty of Medicine, Universitas Gadjah Mada

1 Introduction

1.1 Background

As an emerging middle-income country, Indonesia has been challenged to improve its competitiveness. Policies must be targeted towards unlocking potential for quality development.

One approach is through improving the role of research in formulating and implementing policies.

Research can be a strategic tool to influence policy making. The term 'evidence-based policies' builds on an idea that research (which results in evidence) is a basis for good policy.

The barrier to build research capacity to support policy making and implementation faces any country, including Indonesia. One strategy to deal with the barrier is to enhance the quality of research conducted by Indonesia's universities.

Despite efforts to promote, improve and facilitate research conducted by universities, the quantity and quality remain low. The number of international scientific publications and patents is the indicator.

According to *SCImago Journal and Country Rank*, between 1996 and 2008, Indonesia produced 9,194 scientific publications.[1] The number was below Bangladesh, Kenya, Lithuania and Nigeria—and far below other Southeast Asian countries such as Thailand, Malaysia and Singapore. The Social Sciences Citation Index (SSCI) indicates that the proportion of research reports by Indonesian researchers that have been published in international journals and have been peer reviewed is only 12 percent–half the share in Thailand and Malaysia (Suryadarma et al. 2011).

With regard to patents, the number of patents registered by Indonesian

1 http://www.scimagojr.com, accessed on 24 December 2010.

researchers with the United States Patent and Trademark Office in 2008 was below Singapore, Malaysia, Thailand and the Philippines. Meanwhile, patents registered in Indonesia between 1992 and 2008 were predominantly foreign.[2]

This suggests poor quality of research and human resource development in Indonesia. Nevertheless, the World Intellectual Property Organization (WIPO 2007) has reported that Indonesia's spending for patents is 10.56 patents per US$1 million (around US$94,700 per patent).

This is twice the amount spent on patents in South Korea or other countries. The number of Indonesians who have submitted applications for patents (per US$ trillion in GDP) is equivalent to that of Singapore and higher than Thailand.

The Knowledge Sector Initiative (KSI) is a joint initiative developed by the governments of Indonesia and Australia to enhance the quality of Indonesia's public policies through research, analysis and data.

KSI implements a program to: build the capacity of research institutes; adopt systems and regulations that support research-based policy making; develop an effective model to conduct research and results for policy making; and establish cooperation with various organisations involved in the expansion of access to data resulting from research for policy makers, including government, community organisations and the media.

One expected long-term outcome is the identification and mitigation of systemic constraints on the effectiveness of science by promoting investigation into and discussing key barriers, and supporting efforts to remove these barriers. These efforts are expected to be consistent with the goal of KSI's programs: an enabling condition.

1.2 Research Problem

The problem this study tries to resolve is barriers to university research performance in Indonesia.

1.3 Objectives

The objectives of this research are:

1. Diagnose barriers to research at Indonesia's universities and identify short-term efforts made by universities to overcome these barriers.
2. Identify problems at the conceptual and philosophical levels.
3. Devise strategies for advocacy and to disseminate research findings for policy transformation.
4. Plan interventions during the transformation process.

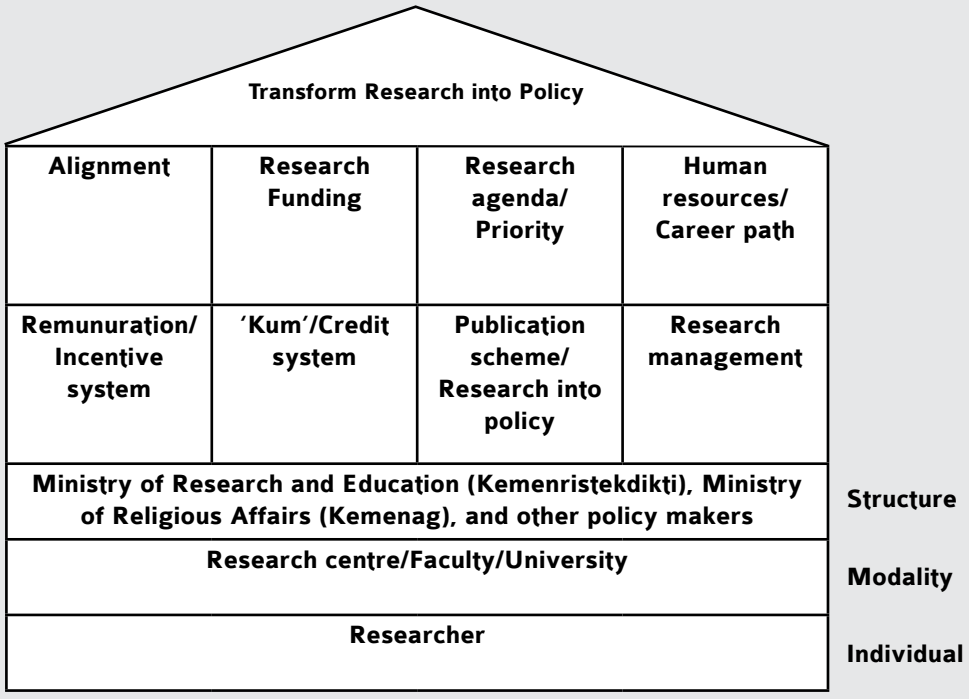
2 Directorate of Patents, Directorate General of Intellectual Property Rights, Indonesian Ministry of Law and Human Rights, 2010.

2 Conceptual Framework, Basic Assumption and Research Question

2.1 Conceptual framework

The conceptual framework of this research is presented in the following figure.

Figure 1: Conceptual Framework of the Research



Eight issues were identified as the focus of the research in the preliminary discussion:

1. Policy alignment
2. Research funding
3. Research agenda/priorities
4. Human resources for research and 'career' path
5. Remuneration for researchers and the incentive system
6. Credit systems/*kum*
7. Publication and research for policies
8. Research management

Each issue was explored in three phases: (i) structures/systems (e.g. government policies, research structures and funding, support to further study the research area, etc.); (ii) modality (e.g. the relevant university's rules and regulations, facilities, research management, a research centre, etc.); and (iii) individuals (e.g. research performance, qualifications, capacity, networking, etc.) (Nugroho et al. 2016).

KSI identified barriers to transforming research results into policy making. It looked at the causes at the institutional level, including at study centres, faculties and high-level agencies (the Indonesian Ministry of Research, Technology and Higher Education or Kemenristekdikti, and other relevant agencies).

In final study reports written at Universitas Gadjah Mada, barriers identified were mostly at the study centre, faculty and university levels.

2.2 Basic assumption

Universities lack attention to research, even considering the Three Principles of Higher Education (teaching, learning and community service).

2.3 Research questions

1. Why is the research performance of universities (quantity and use) poor? What factors are restricting it?
2. What factors can be considered to improve it?
3. What best practices can be adopted as a model to overcome the barriers?
4. What opportunities exist for universities and researchers to improve research performance in Indonesia?

3 Methodology

3.1 Research context

Universitas Gadjah Mada

Universitas Gadjah Mada (UGM) is a government university established on 19 December 1949. Until 2015, UGM had 18 faculties, one master and doctorate school, and one vocational school.

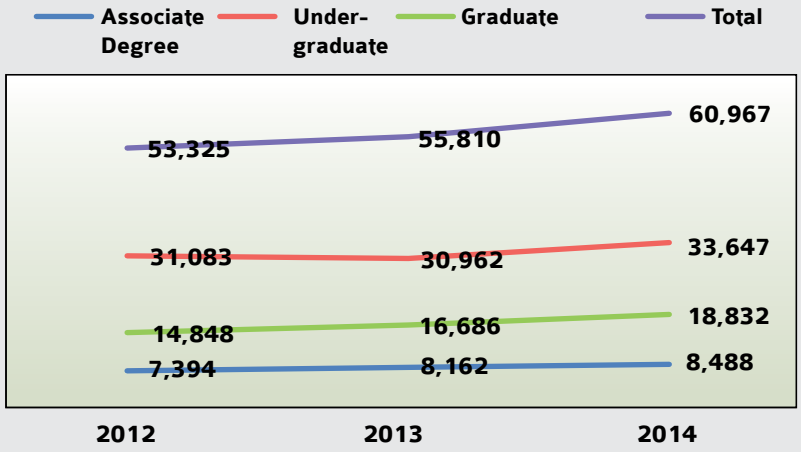
UGM has a vision to be 'a forerunner university at the national level that is innovative and internationally acclaimed, dedicated to national interests, and imbued with the country's cultural values based on *Pancasila*' and a mission to 'teach, conduct research, and carry out community service, as well as preserve and develop unrivalled knowledge that is useful for the people'.

As a university established by the Government of Indonesia with an autonomous public legal entity status (PTN-BH), UGM has autonomy to manage academic and non-academic arenas. The academic arena management includes establishing norms and operational policies, as well as the implementation of the *Tri Dharma Perguruan Tinggi* or Three Principles of Higher Education.

The non-academic arena management includes establishing norms and operational policies, running the organisation, and managing student affairs, personnel, facilities and infrastructure.[3]

There were 53,325 students at UGM in 2012. This grew to 60,967 students in 2014. Half were undergraduate students.

Figure 2: Number of UGM students, 2012–2014



3 Indonesian Government Regulation 67/2013 on the Statute of Universitas Gadjah Mada.

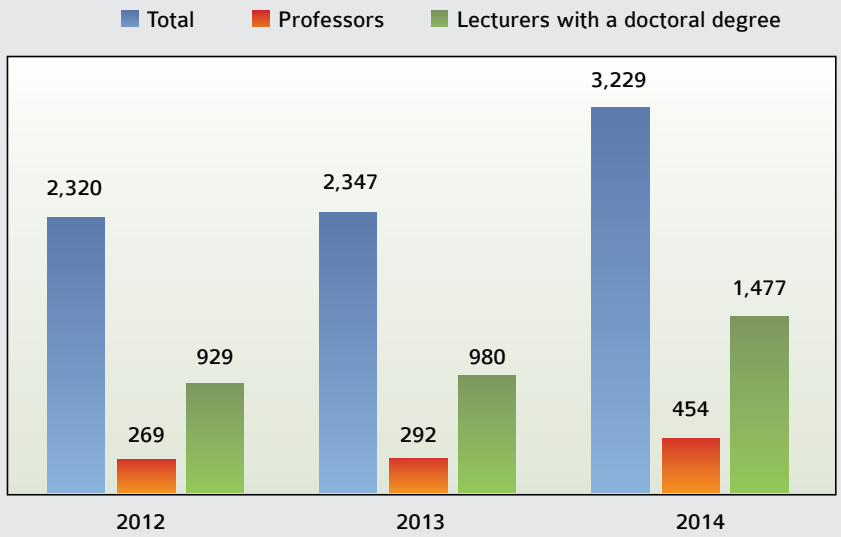
There were 2,320 lecturers teaching at UGM in 2012.[4] In 2014 that number increased to 3,229, as a new calculation considered part-time lecturers.

The number of lecturers has increased to include professors and lecturers with a doctorate degree. The faculties of Engineering and Medicine have the most lecturers.

Research funding was provided by Kemenristekdikti, coupled with other funding sources (grants from other ministries and international donors). Funds provided by Kemenristekdikti are managed by UGM LPPM under a competitive research grant scheme.

UGM has a research information system called 'Prisma' (a portal for research and community services).[6] The portal lists all research topics, statistics and publications.

Figure 3: Number of UGM Lecturers, 2012–2014



Research in UGM is managed by the Directorate of Research at the Institute for Research and Community Services (LPPM), which reports to the Deputy Chancellor Research and Community Services. In January 2016, there were 28 study centres under the LPPM.[5]

Data from the Directorate of Research at UGM shows that nationally funded research still dominates research projects. The ratios of government-funded to internationally funded studies were 12:1 (in 2012), 13:1 (in 2013) and

Table 1: Amount and Source of Research Funding Managed by UGM, 2012–2014

	2012	2013	2014
Number of research studies	1,955	2,277	2,099
Funding source			
National	1,804	2,117	2,026
International	151	160	73

Source: Directorate of Research at UGM

4 Directorate of Research, UGM.

5 See http://lppm.ugm.ac.id/direktori-pusat-studi/

6 http://prisma.lppm.ugm.ac.id

22:1 (in 2014). The number of inventive-innovative research studies increased from 144 studies (in 2012), to 340 studies (in 2013) and 170 studies (in 2014).

Between 2012 and 2014, the number of research reports published by UGM was between 1,894 and 1,965 topics per year (Table 2).

reputation in the areas of basic, clinical and translational research'.

FK UGM manages three undergraduate study programs, six master's study programs, 20 specialist study programs and one doctorate study program. There are approximately 2,000 students enrolled each year. Around half of these are specialist study program students.

Table 2: Number of Research Reports Published by UGM, 2012–2014

Published in	2012	2013*	2014
Journals	1,135	1.203	968
National journals	758		475
International journals	377		493
Proceedings	679	851	743
National proceedings	455		439
International proceedings	224		304
Others	80	161	254

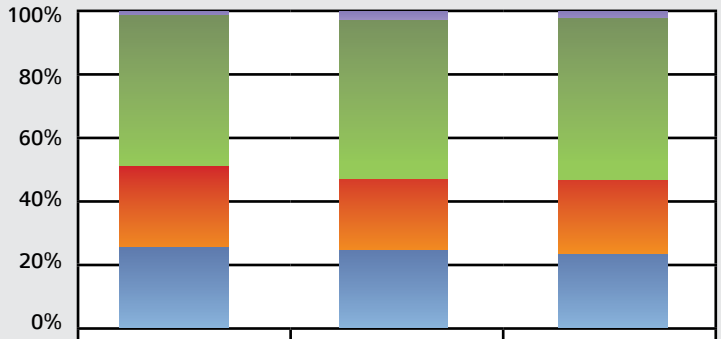
Source: Directorate of Research at UGM
*Data in 2013 did not list in detail the publication typology: national or international journals, or national or international proceedings

Faculty of Medicine at UGM

The Faculty of Medicine at the University of Gadjah Mada (FK UGM) was established in 1946. FK UGM has committed to accelerating the achievement of its goal to be a 'research-based learning institution with an international

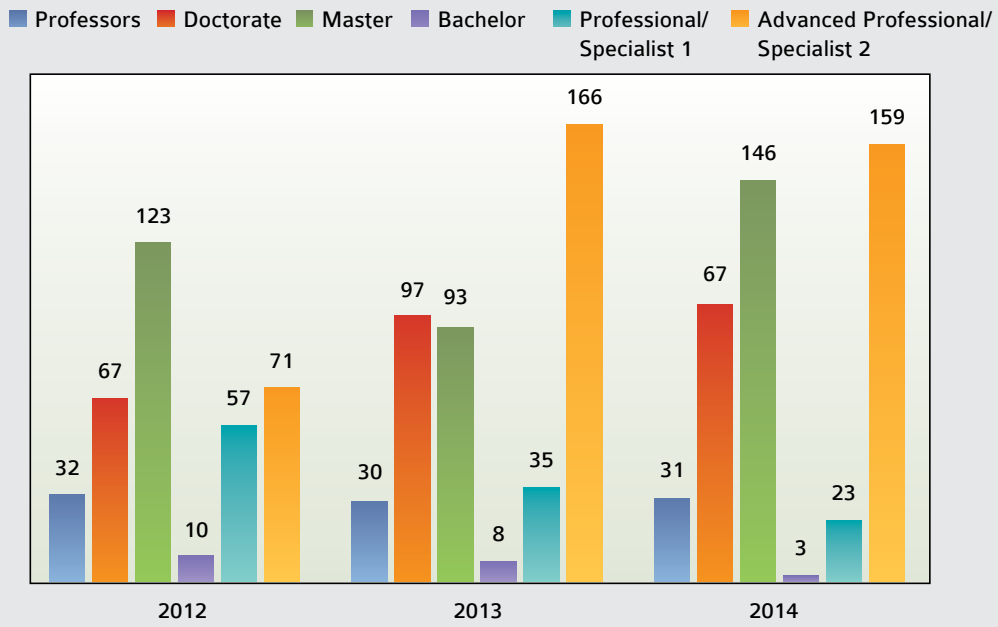
There are 400 lecturers. Between 2012 and 2014 the number of lecturers with a doctorate degree increased. The number of professors remained the same between 2012 and 2014, at approximately 30.

Figure 4: Distribution of FK UGM Students by Level of Study, 2012–2014



	2012	2013	2014
Doctorate	24	52	37
Specialist 1	954	1,050	988
Master	513	479	453
Bachelor	515	504	448

Figure 5: Distribution of Lecturers at FK UGM, 2012–2014



Research funds sourced from parties other than Kemenristekdikti are managed by the faculty. In the managerial structure of the faculty, there is a deputy dean of research, community services and cooperation.

To facilitate research and publications, the faculty established a research and publication office, which is tasked with:

1. Facilitating research activities and cooperation in research
2. Facilitating material transfer agreements and intellectual property rights
3. Identifying funding opportunities, publicly announcing research and publishing and disseminating research outcomes
4. Compiling and disseminating research outcomes through the faculty's website and the media
5. Facilitating the open journal system
6. Compiling (national and international) research data and publications (journals, posters and books).

In FK UGM's structure, there are nine study centres and four research working groups. One of the study centres is the Centre for Health Policy and Management.

Centre for Health Policy and Management at FK UGM

The Centre for Health Policy and Management (PKMK) was established in 1998. PKMK conducts research, provides consultations and training, and networks in four activity areas: healthcare delivery, regulation, healthcare financing and healthcare human resource development.

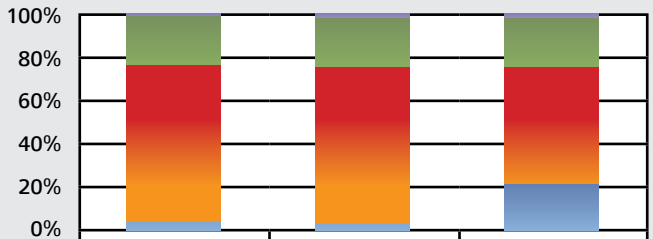
Stakeholders that collaborate with PKMK include national and international agencies (ministries, local governments, state-owned companies, the private sector, and hospitals).

PKMK has four divisions: 1) hospital management; 2) community health policies and management; 3) quality management; and 4) disaster management.

The PKMK director is a full-time lecturer. In 2014, there were 85 researchers/consultants working on project-based contracts. The head of each division is a researcher/consultant working full-time at PKMK. Research assistants, researchers and consultants are recruited through PKMK according to the project needs.

PKMK has supporting units, including a leadership laboratory and community,

Figure 6: Distribution of Researchers, Consultants and Administrative Staff at PKMK, 2012–2014



	2012	2013	2014
Part-time project administrative staff	1	2	2
Full-time project administrative staff	26	27	26
Part-time researchers and consultants	86	86	64
Full-time researchers and consultants	5	6	25

seminars, healthcare management journals and a website. PKMK also has an administrative staff member to manage research projects and consultations.

3.2 Research design

This research is part of a set that uses a case study design (a multiple, embedded, case study (Yin 2003)) at four universities in Indonesia: Universitas Gadjah Mada, Universitas Indonesia, Universitas Katolik Indonesia Atma Jaya in Jakarta, and Universitas Islam Negeri Syarif Hidayatullah.

3.3 Analysis unit

The analysis unit of this study is located at the study centre, PKMK. Data from the faculty (FK UGM) and university levels is used to support analysis at the study centre level.

3.4 Resource persons and sampling

The subjects of this study are 14 lecturers, four full-time researchers/consultants at the study centre, and three policy makers. The lecturers were selected using typical case sampling.

The researchers and policy makers were selected using criterion sampling. The researchers are researchers/consultants at PKMK who have been working for more than two years. The selected policy makers are those with relevant policies on research development at the study centre, faculty and university.

3.5 Data collection

Data was collected during four interviews with study centre researchers/consultants, four interviews with lecturers, an interview with a group of four lecturers, and a focus group discussion attended by six lecturers.

The researcher collected secondary data from documents related to research policy products and studies that had been conducted at the study centre, faculty and university level.

Questions asked during the interviews and focus group discussions, as well as the secondary data collection, were developed by a team of researchers who conducted this diagnostic study in four universities. Data on the UGM case study was collected by researchers and a research assistant.

The researchers discussed the objectives, design, data collection plan and questions that would be asked during the interviews with the research assistant. The main researcher kept an audit trail to evaluate research procedures

and temporary data that had been collected. The temporary analysis was checked by the members.

3.6 Data analysis

Researchers compared patterns identified from the collected data with the research proposal (pattern matching).

3.7 Research etiquette

The research was ethically approved by the Committee of Ethics of the Faculty of Medicine, Universitas Gadjah Mada, which is in Yogyakarta.

4 Research Findings

4.1 Research performance

4.1.1 Number of research studies

The Faculty of Medicine has the best research performance in UGM. Data on information systems from the Directorate of Research at UGM shows that between 2012 and 2014 FK UGM ranked first in the number of studies and publications, compared to other faculties.

The ratios of research studies to lecturers for undergraduate, master's and doctorate study programs can be seen in **Table 3**. The research performance of master's and doctorate study program lecturers is better than that of undergraduate study program lecturers. The ratio of research between 2012 and 2014 also shows that not every lecturer had a research project throughout the year, except doctorate study program lecturers in 2014.

Table 3: Ratio of Research Studies to Undergraduate, Master and Doctorate Study Program Lecturers at FK UGM, 2012–2014

Ratio	2012	2013	2014
S1	0.21 (32 topics/151 lecturers)	0.29 (45 topics/151 lecturers)	0.44 (67 topics/151 lecturers)
S2	0.75 (100 topics/133 lecturers)	0.66 (87 topics/133 lecturers)	0.79 (105 topics/133 lecturers)
S3	0.625 (75 topics/120 lecturers)	0.641 (77 topics/120 lecturers)	1.08 (129 topics/120 lecturers).

Source: Accreditation Form of FK UGM Management, 2015

Lecturers' active contribution to research is not evenly distributed in all study programs. Some specialist study programs did not have any research activities between 2012 and 2014.

PKMK is one of the study centres that actively contribute to FK UGM's research projects and consultations at national and international levels. Its projects are funded by government partners such as the National

Table 4: Number of Research Topics by Study Program at FK UGM, 2012–2014

Study Program	2012	2013	2014
Undergraduate, Medicine	10	13	9
Undergraduate, Nursing	42	25	42
Undergraduate, Nutrition and Health	24	29	24
Master, Public Health	92	136	167
Master, Basic Medical Science & Biomedicine	25	30	26
Master, Tropical Medicine	14	12	12
Master, Clinical Medicine	41	36	48
Master, Medicine	24	6	6
Magister, Nursing	0	11	0
Specialist 1, Dermatology & Venereology	14	0	0
Specialist 1, Paediatrics	27	0	0
Specialist 1, Forensic Medicine & Legal Medicine	2	2	2
Specialist 1, Ophthalmology	5	0	0
Specialist 1, Paediatric Surgery	0	0	0
Specialist 1, Anaesthesiology & Reanimation	6	8	8
Specialist 1, Neurosurgery	0	0	0
Specialist 1, Orthopaedic surgery	7	0	0
Specialist 1, Obstetrics and gynaecology	10	14	18
Specialist 1, Internal medicine	18	49	51
Specialist 1, Psychiatry	4	7	7
Specialist 1, Otorhinolaryngology and Head and Neck Surgery	2	4	2
Specialist 1, Neurology	7	3	2
Specialist 1, Clinical Pathology	9	11	11
Specialist 1, Clinical Microbiology	10	6	6
Specialist 1, Radiology	0	7	2
Specialist 1, Anatomy Pathology	0	9	9
Specialist 1, Cardiology	2	6	2
Doctorate, Health and Medicine	0	19	0

Source: Accreditation Form of FK UGM Management, 2015

Development Planning Agency (Badan Perencanaan Pembangunan Nasional, Bappenas), the Ministry of Health and international donors.

The number of internationally funded projects is almost equal to nationally funded projects. Between 2012 and 2014, there were 38 nationally funded and 33 internationally funded projects.

Among projects managed by PKMK, the share of research projects is only between 30 percent and 40 percent. The total amount of funds provided annually between 2012 and 2014 for research projects and consultations was between Rp20 billion and Rp30 billion.

4.1.2 Number of publications

In 2014, FK UGM published the highest number of research reports in UGM's scientific journals. Data from Prisma indicates that international publications saw an increase between 2012 and 2014 (**Table 5**). Data from the Research and Publication Office at FK UGM shows that the number of publications in international journals increased from 34 in 2012 to 45 in 2014.

Nevertheless, the increased funding provided for research conducted by FK UGM is not commensurate with an increase in the number of publications.

PKMK averages between four and eight articles in scientific publications per year (five articles in 2012, eight articles in 2013 and four articles in 2014). There were six articles published in international journals between 2012 and 2014.

Some studies conducted by PKMK are

Figure 7: Number of Research Projects and Consultations Managed by PKMK, 2012–2014

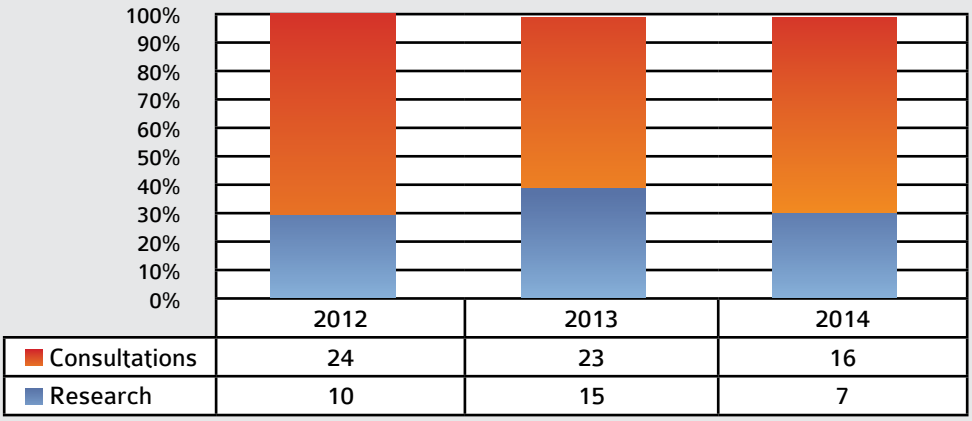


Table 5: Research Report Publication by FK UGM, 2012–2014

Publication	2012	2013	2014
Type			
Journals	275	226	254
Proceedings	61	142	97
Others	4	2	24
Scale			
National	163	207	176
International	177	163	199

Source: http://prisma.lppm.ugm.ac.id

related to policies. PKMK publishes its study reports in policy briefs and on its website.

These methods have been selected because not all study reports on policies are appropriate to be published in international journals. If the target readers of the study reports are policy makers, publication in scientific journals is considered unsuitable.

> "If [publication in] international journals are chosen as an indicator of a study, it will be a challenge for us [PKMK]. Many of the studies that we have conducted are not meant to be published outside [of Indonesia] .... The relevance for those outside of Indonesia [is dubious] .... The information is locally based." (Policy maker 2)

FK UGM does not have an information system intended to document research outcomes other than in national and international scientific journals, books and proceedings. While policy briefs are one form of output of studies conducted by FK UGM, they are not considered suitable for research or study reporting.

4.1.3 Using research outcomes for policy making

Most studies conducted by FK UGM and PKMK have stimulated policy changes. These are generally large-scale studies.

For example, a study on tuberculosis that was funded by a considerably large international grant and involved national policy makers is a reference point for the formulation of a national strategy on disease control.

So far, neither the faculty nor the university has carried out a systematic evaluation of the use of research for policy making. However, documenting the benefits of research for policy making has been initiated by PKMK. In 2016, PKMK published its 2015 annual report entitled, *Cerita Perubahan* or Transformation Stories.[7]

The report presented four policy transformation cases related to healthcare fraud, reducing the maternal mortality rate, regional general hospital management systems, and preparing medical personnel to deal with disasters.

7 http://research.fk.ugm.ac.id/images/2016/PKMK%20Report%202015%20v2.pdf

4.2 Barriers to research at universities

While the Faculty of Medicine and PKMK are work units with good research performance in terms of the number of research studies conducted and published in UGM, barriers remain in the process at the individual, modality and structural levels.

4.2.1 Barriers at the individual level

Motivation

Currently, motivation to conduct research and write and publish research/study reports comes from the relevant lecturers who like to investigate. Productive lecturers like to do research and broaden their knowledge. Some lecturers interviewed said their motivation to conduct research and publish reports in scientific journals came from peers.

Workload and time

Lecturers who are motivated to conduct research find that their teaching load restricts the time they have to write up their reports. Productive lecturers write and publish research reports amid busy schedules.

> "[To] write, [we have to] steal time. So, it is difficult to allocate one day only to write, one week only to write. It is very difficult because there is no time." (Lecturer 7)

Even full-time researchers feel that they do not have time to write reports. Once a research project is completed, they will immediately start conducting another project.

> "The materials are available, but the time to write is not. [We] have actually tried it.... In my opinion, when one wants to write, he/she has to focus on writing. His/her time should be allocated only for writing. Allocate, say, two weeks or one month, focus only on writing. If one writes only in his/her spare time, [s/he can write] only a few pages maximum, before moving on to another task." (Researcher 3)

While research report publication in international journals is one of the indicators for quality measurement at PKMK, full-time researchers or consultants at study centres such as PKMK are not encouraged or required

to publish their research reports in international journals.

Language capability

Writing research reports in English for publication in international journals is challenging for lecturers, particularly senior lecturers.

> "From my experience helping my seniors, the most troublesome task is translating research reports into English, although the data is superb." (Lecturer 6)

4.2.2 Barriers at the modality level

Policy compatibility

FK UGM has researchers or consultants working at the study centres. FK UGM accommodates researchers' roles in the development of research and community services. The university (UGM), facilitated by the faculty, issues decrees for the appointment of educational staff members as researchers. However, some researchers at the study centres work without a decree.

Consequently, the researchers are not entitled to an email account at *ugm.ac.id*, but they need an account to access the university's intranet and database on journals to which the university has subscribed.

Other than the policy on decree issuance by the dean for researchers or consultants, there are no policies on researchers' job descriptions and career paths at UGM.

The lack of a national legal basis for university researchers makes it challenging for universities to develop a policy on researchers.

Regulation of the Minister of Research, Technology and Higher Education No. 25/2015 stipulating identification numbers for lecturers assigned by universities based on work contracts has the potential to formalise researchers at universities. However, at the time this research was completed in February 2016, a further operating policy–such as a regulation on a career path for lecturers recruited based on work contracts–had not been developed.

Policy makers at the university level have revealed that the regulation issued by the Minister of Bureaucratic Reform (PANRB) on authority in human resource management (which PTN-BHs such as UGM have) is clear.

However, a regulation at the national level from Kemenristekdikti is still needed. UGM has a blueprint on human resources, which was issued in 2009, but it is yet to be implemented. The blueprint discusses the status of researchers at the university.

Research funding

While the amount of funding has increased over the last several years, allocation for research in the ministry's budget is deemed low. Guidelines on proposal writing published by UGM LPPM in 2016 mention a research grant 'package' of Rp25 million.

For example, the amount allocated for a young researcher is Rp25 million per proposal approved. It is very low compared to the lowest research grant for a young researcher in Japan, which is estimated at Rp150 million.

Research grants from Kemenristekdikti are considered too small to produce satisfactory quality research outcomes in medicine.

A lecturer said that current research funding made researchers choose a cross-sectional research design, which is methodologically weak, to adhere to the budget and research timeframe (around seven months). A longitudinal design should be able to be selected. While the outcomes would be more beneficial to the public and have the potential to influence policy making, this design requires a longer timeframe and more funding.

As a PTN-BH, in managing research funds provided by Kemenristekdikti UGM must adhere to research grant rules regulated by the ministry. Although the amount of the grants is far from ideal, the policy implemented by Kemenristekdikti must be followed.

Information from a policy maker at the university level revealed that the delayed disbursement of grants for researchers was usually caused by the amount of time the ministry needs to decide on a grant winner. Grant winners are usually announced in March every year.

Human resources for research and a 'career path' in research

PKMK signs work contracts with part-time

and full-time researchers/consultants to conduct consultancies and research projects. At the university level, there is no policy on a career path for researchers. Nor are there guidelines regulating the competency of research assistants and researchers/consultants.

Researchers at study centres, such as PKMK, have career paths. For example, they may start as a surveyor and be promoted to a field coordinator, a co-principal investigator, and finally a principal investigator. However, there is no explanation available about entitlement and responsibility differences between the posts.

Researchers also function as lecturers in some courses, assistants to senior lecturers, or essay/thesis mentors for undergraduate/graduate students. The development of researchers relies on attention from senior lecturers supervising them. A researcher said:

> "We do not receive administrative support... like a decree from the dean. It highly depends on the kindness of or concern from the person we follow. Some lecturers help to take care of their assistants' status. I have a friend who has not graduated from his graduate program, but already got a decree because he happens to have a supervisor who pays attention to him. In my case, I do not have [a decree from the dean] yet, but [the senior lecturer] cares about me. So, I can stay [and study more] at this school." (Researcher 5)

Workloads are a barrier to research at the individual level. There is no data available about workloads as a barrier to research at the university and faculty levels.

Remuneration for researchers and incentives

The university and the faculty offer incentives for articles published in international journals. The amount however has failed to motivate senior lecturers to produce publications. This is probably because the amount of incentive offered is much smaller than the income of senior lecturers.

Another source mentioned that several years ago the amount of incentive offered would not even cover the cost of publishing an article in an open-access international journal.

> "Now, incentives are used to pay for research report publication. Publication costs between [IDR] 15 million and 20 million. The [amount of] incentives [given] is [only IDR] 6 million. So, [we still need to pay for] the outstanding [amount] from our own pocket." (Researcher 3)

This problem has been addressed by FK UGM, which provides remuneration for publication in addition to the incentive offered for writing. FK UGM also offers an incentive for publication in international journals. The amounts offered to an author and co-author are Rp3 million and Rp2 million, respectively.

Credit or 'kum' and research performance monitoring

While UGM and its Faculty of Medicine have devised various information systems, including academic, financial, human resource and teaching record information systems, there is no system to monitor research being conducted by a lecturer.

An information system for the tiered monitoring of research performance is not yet available. The tiered monitoring starts from the university, which monitors the faculty's research performance; to the faculty, which monitors research conducted by work units under it; to work units, each of which monitors individuals conducting the research.

Kum is an instrument with limited usability to assess rank promotion. However, the instrument is not leveraged to monitor lecturers' performance, particularly in conducting research.

Publication and research for policy making

While the number of publications has increased, the increase is not commensurate with an increase in the total amount of research funding managed by FK UGM. Between 2011 and 2014, the total amount of research funding managed by FK UGM increased eight-fold, while the number of research reports published in international journals only increased four-fold.

Lecturers' teaching workloads hinder them from writing research reports. Lecturers with enough motivation to conduct research have usually conducted many research projects. However, they have not written the reports.

Another barrier encountered by researchers to publication in scientific journals is the lack of a system or regulation to motivate them to write. Donors generally only ask for activity reports. PKMK promotes the publication of policy briefs for policy makers.

> "It [policy advocacy through policy briefs] is required. [They are made] to advocate regulators to enable system transformation. However, publishing them in international journals, [we have] not done it yet." (Researcher 2)

In addition to the lack of requirement to publish scientific articles in journals, researchers feel that they do not have enough time to write the articles due to their heavy workloads at PKMK. They often use their spare time after work to resume their consultation or research responsibilities.

The lack of external motivation to write and publish articles in public or non-scientific media or journals was discussed by one researcher:

> "[Lecturers or researchers] should be able to write [something] without research, such as reviews or articles for publication in newspapers or magazines, shouldn't they? The thing is [they are] not encouraged [to do so]." (Researcher 3)

Research management

Using the PTN-BH management system, all research funds from different sources must be recorded in the university's financial system. This financial management system is considered to have lengthened the procedure, but it is still doable.

Research funds sourced from outside Kemenristekdikti are directly managed by the faculty and reported to the university. This also applies to research output reporting. Reports on research funding and the output of studies funded by sources other than Kemenristekdikti are uploaded onto the research information system, Prisma. However, upgrading relies on the initiative of the work units.

Lecturers who were respondents to this study complained about the financial administration of research grants from Kemenristekdikti: the frequently delayed fund disbursement, while the research timeframe remained the same. According to researchers, this impairs the quality of their research. Furthermore, the financial accountability report is deemed too complex.

Much time is wasted dealing with research project administration. Some researchers use administration staff to help them complete administration reports. Others do them by themselves.

Quality assurance

Some junior researchers feel they do not receive adequate guidance from senior researchers, or adequate supervision. They hope reviewers will be recruited to provide feedback on the quality of the studies being conducted.

However, some other researchers' proposals and research reports have been peer reviewed by their seniors. This means that quality assurance is partially implemented, but not yet systematic.

The mechanism for reporting lecturers' performance is adopted by the faculty. However, it is limited to administrative requirement reporting, and not optimised to monitor lecturers' research performance.

Research progress reporting focuses on financial use and fails to address the quality of data collection for research purposes.

Infrastructure availability and utilisation

Research infrastructure, particularly for clinical research, is thought to need improvement. For example, a laboratory which is needed is not available at the faculty or university hospital for research purposes.

While the faculty has subscribed to international journals, some research topics do not have many references in the database. In addition, the database can only be used with an email account and some PKMK researchers do not have a UGM email account as they are not registered in the university's human resource information system.

4.2.3 Barriers at the structural level

Policy compatibility

Clarity about researchers' status and career path at the university is hampered by the lack of a legal basis at the national level. In late 2015, Kemenristekdikti issued a regulation about NIDK, which has the potential to become a legal basis. FK UGM accommodates researchers at the university through the issuance of dean decrees. However, the policy is not followed up by operating policies on status and career paths.

The amount of a grant offered for research can raise issues related to policy compatibility. Policy makers at UGM who were respondents for this study revealed that the reporting of grants for research funding in the amount of between Rp150 million and Rp200 million requires specific financial administration pursuant to the applicable regulations.

> "Studies with a value of between [IDR] 100 million and 200 million, and even studies with a total value of up to [IDR] 50 billion, cannot be managed in the same way as managing studies with a value of [IDR] 15 million. In other words, financial administration is needed. It is troublesome for researchers." (Policy maker 3)

Research funding

The administration of studies funded by Kemenristekdikti is complex. A lecturer complained that:

> "[Lecturers] have to deal with excessive bureaucracy, do this and do that. To be honest, it discourages me. I am discouraged from submitting [my research proposal] because of the complexity [of the bureaucracy]. For example, the shares of the funding division should be [reported] in detail. It is indeed necessary, but in the end our focus is not on the research topics." (Lecturer 3)

Access to funding from Kemenristekdikti is limited to staff members with a national lecturer number (NIDN). PKMK researchers rarely take advantage of research grants from Kemenristekdikti because they do not have a NIDN. Research funding from Kemenristekdikti is considered small, but requires complex administration accountability.

Research human resources and 'career path'

The lack of policies at the university level about researchers' status and career path stems from a lack of policy compatibility regarding those issues.

Credit system or 'kum'

Kum has been updated to boost lecturers' research performance. Currently, the share of research performance in *kum* has been increased. The system plays rewarding and sanctioning roles. Nonetheless, lecturers with insufficient research performance are 'only' sanctioned with no promotion. Promotion is not an external motivation for some lecturers to conduct research.

Remuneration for researchers and incentives

The current incentive mechanism is not coupled with a disincentive mechanism for lecturers who do not productively conduct research.

> "Professors who do not write [a study] should be demoted. It is the correct sanction. Currently, they are not pressured. In fact, people who neglect their responsibilities do exist." (Lecturer 1)

Publication and research for policy making

While research transformation for policy making is considered crucial, no studies have been conducted either by UGM or other stakeholders at the national level to identify the impacts of research on policies. The indicator used to evaluate research output is still limited to publication in scientific journals.

> "Some [studies] gave benefits to the public. However, we did not monitor [those benefits]. We monitor research outcomes only through journals, patents and policy briefs. Direct benefits for the people cannot be monitored." (Policy maker 1)
>
> "Honestly, we cannot talk about measurement

yet. I mean we have to show you our way first, and we have not done that. So, to what extent have impacts been measured? We do not have the tools for measurement." (Policy maker 3)

4.3 Good practices by the university and researchers to overcome barriers to research

4.3.1 Research project management

Signing a contract with administration staff members and research assistants to support research project management is a good practice adopted by some lecturers. This is particularly possible if the research funding is large and enables it.

Lecturers who have won research grants from Kemenristekdikti rarely adopt the practice. However, some lecturers who have won research grants from Kemenristekdikti have the initiative to sign a contract with their assistants and the administration staff to overcome the barrier of heavy workloads. Payments for the assistants are usually taken from payments for the researchers in the grant budget.

At PKMK, research projects are managed more systematically by an administrative person. However, some researchers do not understand the functional differences between a principal investigator and a project manager.

4.3.2 Building capacity to write articles for publication in journals

PKMK and FK UGM seek to build the capacity of lecturers and researchers to write articles for publication in journals. This activity is implemented by inviting lecturers with experience in international publications to act as resource people, as well as bringing resource people from outside (e.g. from Manchester University).

4.3.3 Research transformation for policy making

PKMK has initiated efforts to promote the use of research outcomes in policy making, either by pressure from donors or an internal initiative. The efforts include writing policy briefs, creating a website and directly advocating policy makers.

> "Regarding the policy brief about fraud, we have implemented several activities. First, we used our research outcomes for policy briefs. Afterwards, we conducted advocacy through meetings at the Ministry of Health. We did not hold only one meeting. We had follow-up meetings for further advocacy.... After approval from the ministry, we reconfirmed everything and made it into a draft regulation.... We developed policy briefs at PKMK's initiative." (Researcher 2)

PKMK devises innovations by hiring special personnel as 'full-time messengers' to communicate research and non-research outcomes to policy makers. This practice was motivated by a role model–a lecturer keen to make changes in policies based on research findings.

4.4 Drivers of improving research performance in the university

The following are drivers to improve research performance at FK UGM.

4.4.1 Research agenda and policy

In 2009, the UGM Trustee Board established a policy on research to respond to the world class university movement stipulated in the Decree of the Academic Senate Number 5/SK/SA/2008.[8]

The policy is elaborated in 21 academic policy points, one of which covers the provision of research funding. The amount of funding allocated in the budget to support research is 30 percent of the total budget of the university/faculty. In 2014, FK UGM's budget for research was between 22 percent and 23 percent.

In 2010, a policy on priority studies was established in UGM through the Decree of the Academic Senate Number 2/SK/SA/2010.[9] A policy maker in the university revealed that UGM's priority studies do not refer only to the

8 Decree of the Trustee Board Number 02/SK/MWA/2009 on Legalising the Research Policy and Decree of the Academic Senate Number 05/SK/SA/2008 on the Research Policy, available at http://ugm.ac.id/downloads/Kebijakan_Riset.pdf

9 Decree of the Trustee Board Number 06/SK/MWA/2010 on Legalising Research Priorities and Decree of the Academic Senate Number 02/SK/SA/2010 on Research Priorities, available at http://www.ugm.ac.id/downloads/PrioritasRiset.pdf

national research agenda, but also to studies conducted by the world's leading universities.

The priority research agenda has become reference for all work units at UGM. In 2015, FK UGM revised a research route map by referring to global research, health research and other specific route maps, before finally formulating an institutional route map. The research route map was revised through several public test phases involving researchers.

FK UGM has comprehensively identified the targets of the policy on research (**Table 6**). The targets are:

1. Improved research atmosphere
2. Enhanced quality and improved research integrity of proposals
3. Junior lecturers' improved capacity to pro-

Table 6: FK UGM's Targets in the Research Sector

Target	Program
1. Improved research atmosphere	a. The faculty and the university hospital improve academic atmosphere to enable research activities. b. The faculty ensures that every piece of information on research offers and international research partners is available for lecturers, researchers and study centres/groups. c. The faculty and the graduate study program, particularly the doctorate program, improve alignment between studies conducted by lecturers and studies conducted by students. d. The faculty builds the capacity of lecturers and researchers to leverage the latest journal collection. e. The faculty and the university hospital increase investments in research infrastructure by prioritising research and field laboratories. f. The faculty improves legal-administrative services in research planning and implementation.
2. Enhanced quality and improved research integrity of proposals	a. The faculty and the research implementation unit build institutional capacity to compete at national and international levels through proposal development and multi-disciplinary research planning programs. b. The faculty, the university hospital and the research implementation unit avoid research misconduct and improve research integrity. c. The faculty, the study programs and the research implementation unit plan cross-graduate program thematic research projects.
3. Junior lecturers' improved capacity to produce academic writing and graduate lecturers' improved productivity	a. The faculty and its divisions plan a program to enhance the quality of proposals submitted by junior lecturers through research schemes, mentoring and intensive development. b. The faculty and its division develop a graduate lecturer re-entry program by introducing a special research scheme, aligned with a program to strengthen publications and learning at the graduate study program.
4. Improved supporting functions for research management	a. The faculty establishes a research and publication unit and improves the effectiveness of services provided by the unit. b. The faculty, the university hospital and the research unit develop good research management practice. c. The faculty, the university hospital and the research unit improve publication and research performance.
5. An increase in the number of international publications	a. The faculty and the university hospital provide a mechanism and a medium for lecturers and researchers to build their capacity to write publications in international journals. b. The faculty and the university hospital provide a mechanism and a medium for lecturers and researchers to build their capacity to write publications in international journals. c. The faculty has a journal indexed in Scopus or PubMed.

Source: Accreditation Form of FK UGM Management, 2015.

duce academic writing and post-graduate lecturers' improved productivity

4. Improved supporting functions for research management
5. An increase in the number of international publications

The research policy focuses on output in the form of international publications through strengthening input and research processes (**Table 6**).

Input strengthening can be seen through an increase in the amount of grants provided for lecturers to conduct research, laboratory accreditation, integrated lab development and training in research.

Process strengthening can be seen through an increase in the budget for training in writing for international journals. The faculty supports research outcome dissemination to the public through seminar budgeting, the faculty's website and blended learning.

The faculty facilitates lecturers to win competitive research grants at the international level. The Faculty of Medicine prepares a development fund proposal for lecturers to make the interdisciplinary research team focus on obtaining international research funds.

At FK UGM, research is managed by the Research and Publication Office. A research coordinator is also recruited at the division level.

The autonomy that the Universitas Gadjah Mada has to manage its finances enables the Faculty of Medicine to manage research funding sourced from outside Kemenristekdikti. Between 2012 and 2014, FK UGM managed about Rp40 billion in research funding per year.

At the study centre level, PKMK seeks to build researchers' capacity by sending them to training courses or conferences. This activity has been implemented using project funding.

4.4.2 Research policies

In 2015, there were 20 policies on research at FK UGM. Ethical clearance and research integrity standards were also established.

4.4.3 Research peer-group

Lecturers and researchers have established a group of researchers with similar interests. The group discusses various research proposals and solicits feedback on research reports being written.

According to researchers involved in this informal peer group, this may increase researchers' motivation to conduct research and write publications, while ensuring the quality of the research. Multi-disciplinary research peer groups comprising several divisions at FK UGM have been established.

Data on international publications prepared by FK UGM lecturers in 2014 shows that 17 of 106 publications were written by lecturers of more than one department.[10] However, multi-disciplinary coverage is still limited to the medical and health areas. Researchers hope it will be further developed across faculties and institutions.

Table 7: FK UGM's Revenue for Research, 2012–2014 (in IDR)

	2012	2013	2014	Annual average
Research grant	47,175,441,029	42,315,867,006	33,461,495,489	40,984,267,841
Research grant and donation	18,655,745,000	25,469,561,566	28,423,128,440	24,182,811,669
Research contract and collaboration	1,103,760,823	40,330,608,711	30,333,053,027	23,922,474,187

Source: Accreditation Form of FK UGM Management, 2015

10 http://fk.ugm.ac.id/wp-content/uploads/2014/12/Daftar-Publikasi-Internasional-Dosen-FK-UGM-2014_published-web-FK1.pdf

Table 8: Policies on Research at FK UGM until 2015

1	Definition and types of research/studies	11	Invention and intellectual property rights
2	Principles used in conducting research	12	Safety, health and the environment
3	General provisions	13	Research etiquette
4	Principles of research projects	14	Using humans in research
5	Governance and organisation	15	Using animals in research
6	Human resources	16	Guidelines from other institutions/ organisations
7	Research supporting services and facilities	17	Sponsored research
8	Research funding	18	Research collaboration
9	Responsibility for conducting research	19	Using the faculty's identity in research output
10	Quality assurance	20	Publication

4.4.4 Information on research grants

The university and faculty have tried to encourage lecturers and researchers to access large research grants. For example, UGM LPPM regularly publishes updates on grant opportunities from donors for research funding on its website: http://lppm.ugm.ac.id/info-penelitian/.

FK UGM, through the Research and Publication Office, provides information on the 'deadline for offers' on its website: http://research.fk.ugm.ac.id/.

4.5 The university's and researchers' expectations, and opportunities for research improvements in the university

4.5.1 Clarity about researchers' status, career paths and wellbeing in the university

Researchers in the university believe there is a need for clarity about their status and career paths. One researcher stated:

> "I think [rules about researchers' status and career paths] are critical. When we work, we need clarity about status. For example, we have dedicated ourselves here, we show unswerving loyalty, but our status is still a researcher. No promotion is offered to us." (Researcher 2)

Researchers want to have the same status and career path as those being offered to lecturers, including the same health insurance and pension schemes.

4.5.2 Research agenda

The current research agenda is the same as the institution's research agenda. Policy makers at the faculty level hope an individual research agenda will be agreed upon, which can be linked to lecturers' individual research portfolios.

4.5.3 Workloads

A lecturer suggested that there should be flexibility to address the *Tri Dharma* workloads, for example by allowing lecturers to choose an element of the *Tri Dharma* they want to focus on in a particular period of time. Some alternatives to the workload policy suggested in this study are:

1. Lecturers may choose to focus on teaching in one semester and on conducting a study in another semester (being relieved of their teaching responsibilities).
2. A policy should be adopted that when a

lecturer's research performance is excellent, s/he should be relieved from his/her teaching responsibilities.

3. Young lecturers who have just graduated from their doctorate study programs should be asked to focus on conducting research in the first several years, rather than focusing on teaching.
4. Lecturers with good research performance should be assigned 80 percent to 90 percent of their workloads for research and 10 percent for teaching.

To support these suggestions, lecturer mapping by research performance should be carried out first.

4.5.4 Research infrastructure

Lecturers and researchers expect facilities and working conditions that support them to be more productive. The following is an expression of a researcher's expectations:

> "I want each of us to have a special room, one room for each person, or one big room with partitions. It is to enable us to concentrate on our work. We have been using one big desk, so we cannot focus on our work. We always have to continue our work at home, from sunset to 10:00pm or beyond, to midnight sometimes." (Researcher 2)

Lecturers and researchers also expect more conducive working conditions, such as a special work room and a room to read literature, improved and stable internet speeds and connections, cloud back up, and original software.

Lecturers who often conduct basic studies expect integrated laboratory infrastructure improvement with a complete facility. During this study, the integrated research laboratory was being established.[11]

4.5.5 Interdisciplinary research forum

While a multi-disciplinary research pilot group is available, the initiative is not undertaken systematically. Lecturers hope that the presence of a research forum can be used to share research ideas and meet people from a different discipline but with a similar research interest.

> "Now, most studies are probably conducted in only one department. People whose focus of study is micro only conduct research about micro. Surgeons only do surgeries. I see that paediatric studies involve paediatricians, pharmacists and IKM. It has been initiated, but I want more cross-department forums." (Researcher 3)

The university and the faculty have facilitated the realisation of this hope. For example, a grant of Rp25 million was offered in 2016 for a multi-disciplinary research proposal.[12]

Researchers hope a research group will be established and facilitated through collaboration with other universities with similar research interests. The collaboration is expected to be consistent with the capacity of each university.

4.5.6 Facilitating translation and English editing

Given lecturers' and researchers' limitations in writing articles in English, they hope there will be a special technical unit to overcome this. The unit will help researchers translate publication materials written in Indonesian into English and edit publication materials already written in English.

4.5.7 Capacity building for lecturers to write articles for publication in international journals

Efforts have been made to build lecturers' capacity to write articles for publication in international journals. However, researchers believe that the training sessions that have been organised targeted researchers with manuscripts. Lecturers hope that training will be held targeted towards all lecturers.

> "[Training] on writing for international [journals has been conducted for] those with manuscripts rather than for lay lecturers." (Lecturer 3)

11 http://research.fk.ugm.ac.id/index.php/laboratorium/laboratorium-riset-terpadu

12 http://lppm.ugm.ac.id/wp-content/uploads/2016/02/Panduan-Proposal-Multidisiplin-2016.pdf

4.5.8 Mentorships for research quality

Researchers feel there is a lack of interaction between senior and junior researchers for mentoring. Researchers hope systematic interaction will be created between senior and junior researchers to maintain research quality.

"Regarding quality, probably because there are not many senior researchers, mentorships are not adequately provided." (Researcher 2)

The lack of mentoring by senior researchers can be attributed to heavy workloads and limited time to evaluate studies.

5 Discussion

5.1 Research performance

The Faculty of Medicine has the best research performance in UGM. This study shows that efforts have been made in the last three years at the faculty and study centre levels to improve research procedures.

This has been done through research agenda and policy improvement at the university level, which is translated at the faculty and study centre levels.

Further, research quality assurance has been initiated, although research standards are still being prepared. Incentives are being offered for research projects and publications.

Not only are incentives offered for research output, they are also offered to enhance the quality of research proposals to enable them to compete for international grants. Graduate lecturers gain attention through the productivity improvement program for lecturers. In addition, a Research and Publication Office has been established.

Those efforts were made as a result of an eight-fold increase in FK UGM's budget for research in 2014, compared to 2012.

It was made possible by UGM's management autonomy. The autonomy covers academic and non-academic affairs, including organisational management, finance, student affairs, personnel, facilities and infrastructure.[13]

5.2 Barriers to research

This study has identified some individual, modality and structural barriers to research, particularly at FK UGM and PKMK. Findings from this study validate and strengthen findings from the preliminary study conducted by Nugroho et al. (2016).

The number of lecturers with a doctorate degree and professors at FK UGM is only between 20 percent and 30 percent of the total number of lecturers. The share of professors at FK UGM is less than 10 percent of

13 Indonesian Government Regulation 67/2013 on the Statutes of Universitas of Gadjah Mada.

the total number of lecturers. It is likely that the small share of professors is related to difficulties in proposing candidate professors to the central government.

Professors are expected to be pillars that will strengthen research procedures at universities. However, their productivity is yet to be systematically evaluated.

This study reveals that there is no mechanism available to assess professors' role in improving research at universities. Furthermore, no incentive and disincentive mechanisms are in place that relate to professors' research performance.

Research funding remains a barrier. The amount of a research grant from Kemenristekdikti is lower than the amount needed to conduct quality study. Research funding provided by the government is also relatively small. In 2013, government spending for research was only 0.09 percent of Indonesia's GDP.

This case study also highlights barriers related to researchers and their career paths. In his preliminary study report, Nugroho et al. (2016) mentioned the scarcity of full-time researchers hired by the university.

At FK UGM, there are staff members who function as researchers and project consultants. However, no guidelines describe their rights and responsibilities as a researcher or consultant. Similarly, there is no clear policy about career paths for researchers that does not contradict UGM's and national regulations.

Karagiannis has recommended university researchers be tasked with teaching (2009). Research topics can be incorporated into their teaching curriculum in order to create a link between teaching and research responsibilities.

Junior researchers, such as doctorate students and post-doctorate researchers should be involved in teaching activities.

The two barriers mentioned most by informants of this study were time limitations for conducting research and the complexity of research report administration for research funded with grants from Kemenristekdikti. These barriers have made researchers lose their focu s on the quality of research procedures and output.

Another finding relates to infrastructure barriers, including integrated laboratories and facilities for lecturers to write proposals, reports and research report publication scripts. This supports findings from the preliminary study conducted by Nugroho et al. This study indicates that efforts to increase the total amount of grants provided for research are significant, but insufficient. Researchers need to be equipped with adequate facilities to conduct research and write research reports for publication.

Incentives to publish research outcomes in international journals are provided by UGM and the Faculty of Medicine. This represents a commitment to the provision of stronger incentives to publish research outcomes. Incentives may also need to be provided to transform research outcomes into policies.

Other types of incentives, including the translation of draft articles into English for publication in international journals should also be considered.

Research project management is a barrier for some researchers. FK UGM and PKMK have a structure to manage research projects. PKMK has an administration staff to manage research projects, but the role of the Research and Publication Office should be redefined. The role of the sectional research coordinator should also be redefined.

A new type of barrier revealed in this study is the individual barrier, such as internal motivation.

Lecturers with high research productivity tend to have stronger internal motivation. Other individual barriers such as time limitations and heavy workloads, which were identified by Nugroho et al. are also identified in this case study.

Individual barriers are commonly encountered when conducting research, including in other countries (Pager et al. 2012).

As revealed in this study, Karagiannis has recommended a solution, which is to allocate flexible time for research and teaching activities, as applied in the Netherlands.

This study also finds that FK UGM's research productivity improves along with the

systematic improvement of research procedures, from input to output.

Efforts made by the government to improve research conducted by universities are sporadic. Such efforts include sending lecturers to study abroad (input) and providing incentives for scientific publications (output).

Efforts should be made to create an atmosphere that promotes research. There should be improvements during the process, such as translating drafts into English and quality assurance.

5.3 Transforming research into policies

This case study reveals that the studies conducted by FK UGM with findings that affect policy are large-scale studies conducted together with policy makers at the Ministry of Health.

A desk study conducted by Koon et al. (2013) revealed that the successful use of research outcomes in policy making relies on reputation, the researcher's capacity, the quality of the relationship between the researcher and the policy makers, and the quantity of interactions with the policy makers and other stakeholders.

FK UGM has a national reputation among institutions that provide medical education.

In large-scale studies, a partnership with policy makers increases the potential for the research to be transformed into policy. Researchers' capacity and interactions with policy makers need to be further explored.

It is critical to disseminate knowledge about research transformation as a lesson learned for other universities.

This case study explores good practices initiated by FK UGM PKMK to transform research outcomes into policies using several methods, including disseminating information on a website and in policy briefs, and creating a full-time messenger to communicate research outcomes to policy makers.

These initiatives underline with the importance of intermediaries or academic brokers between researchers and policy makers to successfully transform research into policy and address the scarcity of academic intermediaries in developing countries (Carden 2009; Otten et al. 2009).

The processes and outputs of PKMK's initiative to transform research outcomes into policy should be evaluated in order to develop an effective model that can be made into a lesson learned on a larger scale.

5.4 Research restrictions

The analysis units of this study are under FK UGM and the study centre, PKMK. Research generalisation is theoretical generalisation. Theoretical generalisation referred to in this study is a move to enrich and strengthen findings about barriers to research at universities, which have been discussed by other researchers.

This case study was conducted in an institution whose research performance record is relatively better than similar institutions. Moreover, the participants of this study tended to have concerns over research conducted by universities.

The researchers contacted lecturers with poor research performance, but did not receive any responses. For this reason, it is very likely that findings about barriers to research will be 'underestimated'. It is likely that more barriers will be encountered by institutions with research performance and publication, unlike those of FK UGM.

6 Conclusion and Recommendations

6.1 Conclusion

This study has drawn a conclusion that individual, modality and structural barriers hamper FK UGM and PKMK's research performance.

Efforts to improve universities' research productivity have been made, but need to be improved to overcome individual barriers through strengthening research procedures that have been developed.

Systematic or institutional efforts to improve the quality of research should be made by, for example, sending teaching staff abroad to enrol in a doctorate program. In addition, various efforts need to be synergised to overcome the modality and structural barriers.

6.2 Recommendations

This study offers the following recommendations to national research, UGM, FK UGM, and PKMK policy makers:

To national research policy makers

1. Develop a policy on career paths for university and post-doctorate program researchers.
2. Review the policy on *Tri Dharma* implementation at the lecturer level.
3. Consider indicators for research output other than the number of scientific publications, intellectual property rights, or commercial products produced based on the research (e.g. the use of research outcomes in policy making).
4. Urge Kemenristekdikti to publish its list of research grant winners earlier to avoid delays in grant disbursement.

To UGM and its Faculty of Medicine

1. Consider a lecturer's motivation to conduct research as one of the main criteria in selecting lecturers.
2. Develop an operating policy that will provide more opportunities (time

and facilities) to write quality research reports for publication.
3. Enhance the quality of research infrastructure, including a complete, integrated laboratory for medical research.
4. Complete the infrastructure needed by lecturers and researchers to write quality proposals, reports and publication drafts. This includes original software and an office space that is conducive to research.
5. Develop a post-doctorate program for staff members who just completed their doctorate programs.
6. Develop an interdisciplinary peer group, encouraged to compete for research grants provided by parties other than Kemenristekdikti.
7. Make a policy on research human resources as referred to in UGM's 2009 blueprint.
8. Appreciate work units that have reported their research funding and performance to the university.

To PKMK

1. Facilitate researchers or consultants who have not been registered on the university's human resource information system to receive a decree from the dean or rector.
2. Develop systems to monitor and evaluate the quality of research projects managed by PKMK, such as the peer-review of projects being implemented.

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