

博士論文審査結果報告
Report on Ph.D. / Doctoral Dissertation Defense

National Graduate Institute For Policy Studies
 Professor INTARAKUMNERD, Patarapong

審査委員会を代表し、以下のとおり審査結果を報告します。

On behalf of the Doctoral Thesis Review Committee, I would like to report the result of the Ph. D. / Doctoral Dissertation Defense as follows.

学位申請者氏名 Ph.D. Candidate	PUNYAKORNWONG, Warangkana		
学籍番号 ID Number	DOC15151		
プログラム名 Program	科学技術イノベーション政策プログラム Science, Technology and Innovation Policy Program		
審査委員会 Doctoral Thesis Review Committee	主査 Main referee	INTARAKUMNERD, Patarapong	主指導教員 Main advisor
	審査委員 Referee	有本 建男 ARIMOTO, Tateo	副指導教員 Sub advisor
	審査委員 Referee	鈴木 潤 SUZUKI, Jun	副指導教員 Sub advisor
	審査委員 Referee	黒澤 昌子 KUROSAWA, Masako	博士課程委員会委員長代理 Doctoral Programs Committee Representative
	審査委員 Referee	宮崎 久美子 MIYAZAKI, Kumiko	外部審査委員 Referee from outside institutions (東京工業大学 教授/ Tokyo Institute of Technology)
論文タイトル Dissertation Title (タイトル和訳)※ Title in Japanese	Impacts of Research Team Diversity and Top Management on Research Commercialization of a Public Research Institute in Thailand タイ国の公的研究機関における研究チームの多様性とトップマネジ メントが研究成果の商業化に対して及ぼす影響		
学位名 Degree Title	Doctor of Policy Studies / 博士 (政策研究)		
論文提出日 Submission Date of the Draft Dissertation	2018年 6月27日	論文審査会開催日 Date of the Doctoral Thesis Review Committee	2018年 6月27日
論文発表会開催日 Date of the Defense	2018年 7月25日	論文最終版提出日 Submission Date of the Final Dissertation	2018年 7月25日
審査結果 Result	合格 Pass		
	不合格 Failure		

※タイトルが英文の場合、文部科学省に報告するため、和訳を付してください

If the title is in English, please translate in Japanese in order to report MEXT.

1. 論文要旨 Thesis overview and summary of the presentation.

A cross-functional teams (CFTs) is composed of individuals from different departments within the firm such as R&D, marketing, engineering and production. It is considered as one method of innovation management to increase the success rate of research commercialization. This approach can minimize redundancy, balances diversity, and complementarily helps to attain a synergy of information, knowledge, culture, and technique. Nonetheless, previous studies on cross-functional teams (CFTs) focusing on public-sector were limited. Even though some public research institutes (PRIs) had implemented CFTs, they did not objectively evaluate their impacts. Therefore, this is the Ms. Punyakornwong's thesis aims to investigate the influence of team diversity on CFTs to enhance research commercialization PRIs. The study analyzes team diversity of R&D projects in different technology context i.e., information and communications technology (ICT), biotechnology, materials technology and nanotechnology and investigates. It also investigates how top management by executives supports CFTs to enhance research commercialization. National Science and Technology Development Agency (NSTDA), the largest public research institutes (PRI) in Thailand, was used as a case study. Both quantitative and qualitative methods were applied.

After analyzing NSTDA's R&D projects by using Poission regression method, it is found that the high diversity of function/departments, high diversity of educational fields, team size (as a control variable) and timing of project completion (as a control variable) influence on the number of license agreements. After dividing these data into four technology fields and analyzing by Poisson regression method in each technology field, it shows that there are differences in team diversity factors supporting CFTs in each technology field. ICT and high diversity of functions are significant factors influencing on duration for achieving the first license agreement.

Qualitative case studies of selected R&D projects confirm the regression results and cross-tabulation analysis. In ICT projects, there is a relationship between the high diversity of educational fields and low/high diversity of functions/departments, while high diversity of functions/departments and medium diversity of educational fields are significant factors for biotechnology projects. In contrast, the results of materials technology case-studies confirm that the high diversity of educational fields influencing the number of license agreements. Furthermore, they prove that high diversity of functions/departments helps CFTs easily achieve the first license agreements. Four case-

studies involve the expected licensees for scaling up from laboratory scale to pilot scale and training the expected licensees before licensing technologies. Although there are no significant factors influencing the number of license agreements in the Poisson regression, it is found that nanotechnology projects achieving two license agreements have the relationship between the high diversity of functions/departments and medium diversity of educational fields. In addition, the findings from case-studies indicate that before adopting CFTs, research teams developed only laboratory prototypes and did not transfer research results to the beneficiaries. After adopting CFTs, it can be summarized in four types. First, team diversity causes successful licensing. Second, the expected licensing causes team diversity. Third, top management support causes team diversity and successful licensing. And fourth, the project leader who had close connection with the university researchers and government agencies causes team diversity and successful licensing. To summarize, her study proves that PRIs need diversified CFTs. Technology fields, industrial sectors, top management and the middle level management and different levels of Technology Readiness Levels (TRLs) do matter, as they have impacts on success of R&D commercialization. Policy recommendations related to promotion of team diversity and involvement of top management in R&D were proposed, namely, incentive policy and personnel rotation policy.

2. 審查報告 Notes from the Doctoral Thesis Review Committee (including changes required to the thesis by the referees)

The committee agreed that her thesis is more appropriate for Doctor of Policy Studies, rather than Ph.D. in Public Policy, as her thesis is more policy oriented. For her revision, she should address the following issues:

1 Literature review. Technology fields are important factors. The candidate should review more previous studies.

2. Framework. The research framework is rather too simplistic since several important elements are missing. The most important element is the sector specific, technology specific, innovation model related component. ICT is known to be based on a coupling model, biotechnology is based on a technology push model. Another factor to consider is whether the research is related to a system, product, or a core technology. In the case of a system or a product, there will be a need for people in various technological areas, functions, specializations to be involved.

3. Methodology. The candidate need to explain how “potentially licensable projects” were chosen and why number of licensing projects was used as an indicator (not others like licensing income and patents).

4, Quantitative analysis. The timing of project completion should also be controlled in the regression. Biased variables, namely, top management support and incentives should be excluded in quantitative analysis but can be used in case studies. The impacts of GII initiative on cross functional team should be studied. Clearer definitions and rationales of including education level as a variable are needed (are the differences between degrees the same)? The candidate should analyse the state of diversification for each type of technology. For each type of technology, cross-tabulations of more than a single diversity category (e.g. a functional and education mix) should be done.

5. Qualitative analysis. The focus should be given to how and why team diversity and top management affect commercialization. The qualitative case studies should be used to explain the differences between technology fields pointed out by the quantitative study. A clear historical step-by-step timeline and explanation is needed.

6. Conclusion and generalization. How can one generalize the findings, based on a study carried out in a single PRI in a single country? The candidate should add one section on 'Limit of thesis' after the scope of study in the methodology chapter and make a suggestion for further studies.

7. It needs further editing in terms of paragraphing, grammar, and typos so that it will be easier to read

3. 最終提出論文確認結果 Confirmation by the Main Referee that changes have been done to the satisfaction of the referees

The candidate has satisfactorily addressed all concerns raised by the Thesis Review Committee. She has substantially reviewed literature related on the impacts of CFTs in different technology fields on R&D commercialization. She has added the aspects of business sectors, technology fields, and level of technology readiness in her framework.

She has clarified how “potentially licensable projects” were chosen and why number of licensing projects was used as an indicator. Her thesis found that high degree of difference in educational fields/majors and team size strongly influence the number of license agreements on ICT projects, whereas high degree of difference in functions/departments positively relates to the number of license agreements in biotechnology projects. On the other hand, the high diversity of educational fields, team size and the number of years from project completion in a given year to accounting as the licensed project in 2017 as the control variables are significant factors for materials technology projects, but there are no significant factors at the 95% confidence level influencing the number of license agreements in nanotechnology projects

For qualitative analysis, she added more case studies including both successful and unsuccessful ones. In total, there are 15 case-studies consisting of eleven successful and four unsuccessful cases. They cover different technology fields, namely, ICT, biotechnology, materials technology and nanotechnology.

Her thesis contributes to the understanding of the impacts of CFTs on research commercialization through variables like technology fields, roles of top management, technology readiness level

She has provided policy recommendations related to research management of public research institutes (PRIs) namely methods for assisting the low absorptive capacity licensees receiving new innovations/technologies, incentives/career path and personnel rotation.

4. 最終審查結果 Final recommendation

The candidate is qualified for Doctor of Policy Studies